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NEW ZEALAND

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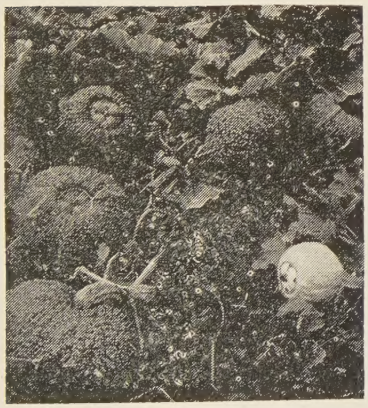

Cover

The pumpkin is a popular cold-weather vegetable with New Zealanders. Several excellent varieties have been available for many years and a favourite is the brightly coloured Warren squash. Early maturity is an advantage of this variety and it keeps well through winter.

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Something Old, Something New at
RUAKURA FARMERS' CONFERENCE

REVERTING to a four-day programme, with restitution of the day of papers and discussions on subjects of general interest to all farmers, the Ruakura Farmers' Conference Week in June at the Department of Agriculture's Ruakura Animal Research Station, Hamilton, was an unqualified success.

THE Ruakura Farmers' Hall, with accommodation for 1,000, was packed for the first paper on the opening day for sheep farmers and remained crowded on the other days for all farmers and for dairy farmers. There was tremendous interest by farmers and the public in an evening session discussion on United Kingdom and New Zealand viewpoints on the European Common Market; and other evening sessions of a symposium on beef production and a question time for all-comers, with a panel of Ruakura and Rukuhia Soil Research Station staff on the stage, showed no flagging of interest.

Portent of the closer integration of the work of Ruakura and the Rukuhia Soil Research Station was arrangement and chairmanship of the reinstated day for all farmers by Mr I. L. Elliott, Superintendent of Rukuhia. Plans have been under way for some time for the transfer of Rukuhia from its present site to Ruakura.

A popular addition to the demonstration points on the conference field day was the Meat Industry Research Institute, whose new laboratories on 7½ acres of Ruakura were opened last March. Current meat research projects and display of a wide range of packaged export meat attracted particularly keen interest in view of the emphasis during the conference on new developments in meat production and marketing.

The Dairy Board's Artificial Breeding Centre at Newstead was another extra-Ruakura activity among the 15 demonstration points served continuously by a fleet of buses on the field day. Here, in the new bull barns built to cope with the rapidly expanding demand for the services of the centre, dairy and cattle men could see the wide range of dairy and beef sires used in artificial breeding work and discuss their merits with staff. There was an increase of 79,000 in the number of cows artificially bred last year, and 550,000 are expected to be artificially serviced in this season's spring matings. A second centre near Palmerston North is expected to be operating this spring, with Mr E. D. Fielden, late of Ruakura, in charge.

The Whatawhata Hill Station was open to sheep farmers on the afternoon of the field day.

Displays and demonstrations by the Forest Service (farm uses for treated timber), agricultural machinery and aviation firms, and field officers of the Department of Agriculture supplemented the Ruakura research demonstrations and added interest and variety to a field day that drew about 5,000 visitors to the Station.

For Sheep Farmers

Tupping: The results of recent experimental work at Ruakura and elsewhere on the percentage of rams required and the time they should be joined with the flock were presented to the conference in a paper by D. G. Edgar. Providing rams were tested for fertility, farmers could safely use a smaller percentage than the traditional 2½ to 3 per cent.

The presence of rams joined early in the season not only advanced the breeding season of the ewes but led to a much more concentrated tupping. In contrast, joining later increased the chances of getting a higher lambing percentage.

Ewe Nutrition and Fertility: As pasture is the sole diet of the ewe flock on most farms, the only way the farmer can control the nutrition of his animals is by pasture and grazing management. Precise knowledge of the way that ewes can be expected to respond to different levels of feeding at different times of the year has been sought at Ruakura.

Reviewing the present knowledge, L. R. Wallace said that on most farms a decision has to be made at weaning time how the feed available can be most profitably used. It would seem

Demonstration of the project to measure milk production of beef cows, with Miss D. E. K. Walker discussing experimental data and, in the foreground, some of the experimental animals.

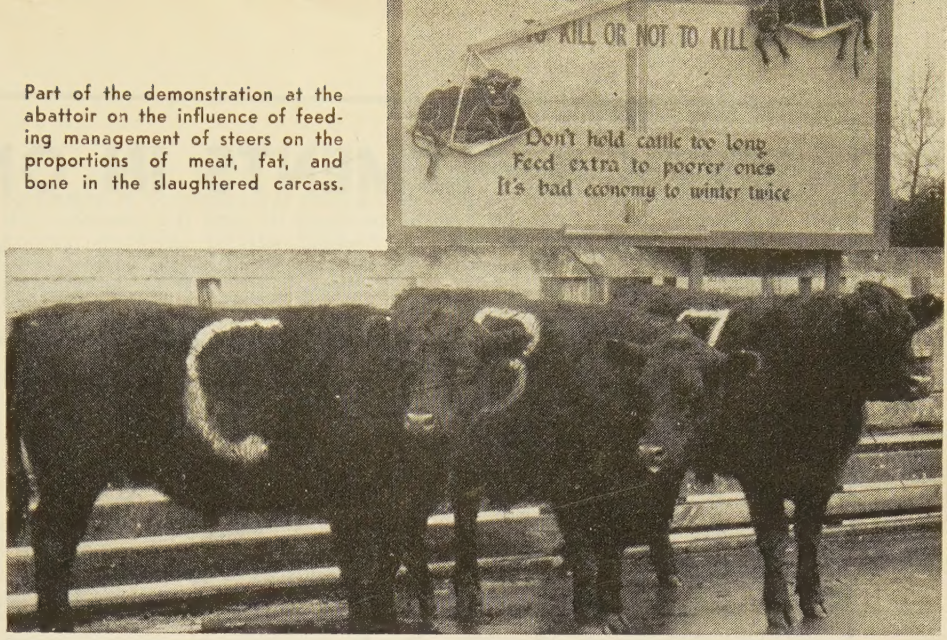
wise to ensure that feed is conserved for flushing, even if this means that the breeding ewes would have to be done fairly hard after weaning. But there appeared to be no good reason for grazing the flock any harder after weaning than is necessary to ensure that enough feed is saved for the lambs, cull ewes, and cattle, and also for flushing.

If the feed supply dictates that the breeding ewes have to be done fairly hard after weaning, any animals in poor condition should be drafted off from the main flock and given preferential treatment. The main consideration is to keep all ewes in reasonably good order and at all costs to avoid any being in really poor condition when mating begins.

Facial Eczema Research: Progress with research since the break-through of the discovery that a microscopic fungus associated with pasture was the source of the facial eczema toxin was reported by Dr C. P. McMeekan, Director of Ruakura. What is believed to be the toxin has been extracted in pure crystalline form and its chemical formula established, but its structure is still being studied and it is likely to be some time before chemists know the precise kind of material they are dealing with.

This knowledge could be vital to possible development of a vaccine or of some chemical agent to protect animals from the effects of the poison. Though much work has been done in the attempt to develop a vaccine, there is no indication that this approach will be fruitful.

Though a great deal has been learned, the only practical system of protection of sheep and cattle against the poison is to prevent them taking it in with their food. The removal of stock from pastures during dangerous periods, the use of safe crops as a feed during these periods, or the shutting up of animals on silage or hay are still the only practicable methods of control.



Part of the demonstration at the abattoir on the influence of feeding management of steers on the proportions of meat, fat, and bone in the slaughtered carcass.

There is a prospect, however, of the new knowledge making possible more accurate prediction of danger periods through the establishment of district spore trapping and counting services.

"Farmers anxious for rapid progress may be disappointed," said Dr McMeekan, "but some day, with understanding support, facial eczema will be relegated to the status of an accepted and understandable hazard of grazing stock, and its easy prevention and control will be accepted as a part of good farming."

Display at the field day of some of the complicated chemistry of the research should have convinced most farmers who saw it that Dr McMeekan's report was no understatement.

Wool: A series of three papers on the practice of what has come to be called "multiple" shearing in the north was preceded by one by J. P. Joyce of the Whatawhata Station on investigation into the incidence and causes of cotting in fleece wool.

Among the conclusions drawn from the research was that shearing interval

Left—Discussion of butterfat production data from the experiments at No. 2 Dairy with light and heavy stocking under controlled and uncontrolled grazing systems. Right—Main interest at the Pig Centre was in progress with testing the suitability of the Landrace breed for incorporation in the "National Hybrid" programme and in farrowing accommodation designed, adapted, and developed at the Station to prevent piglet losses.

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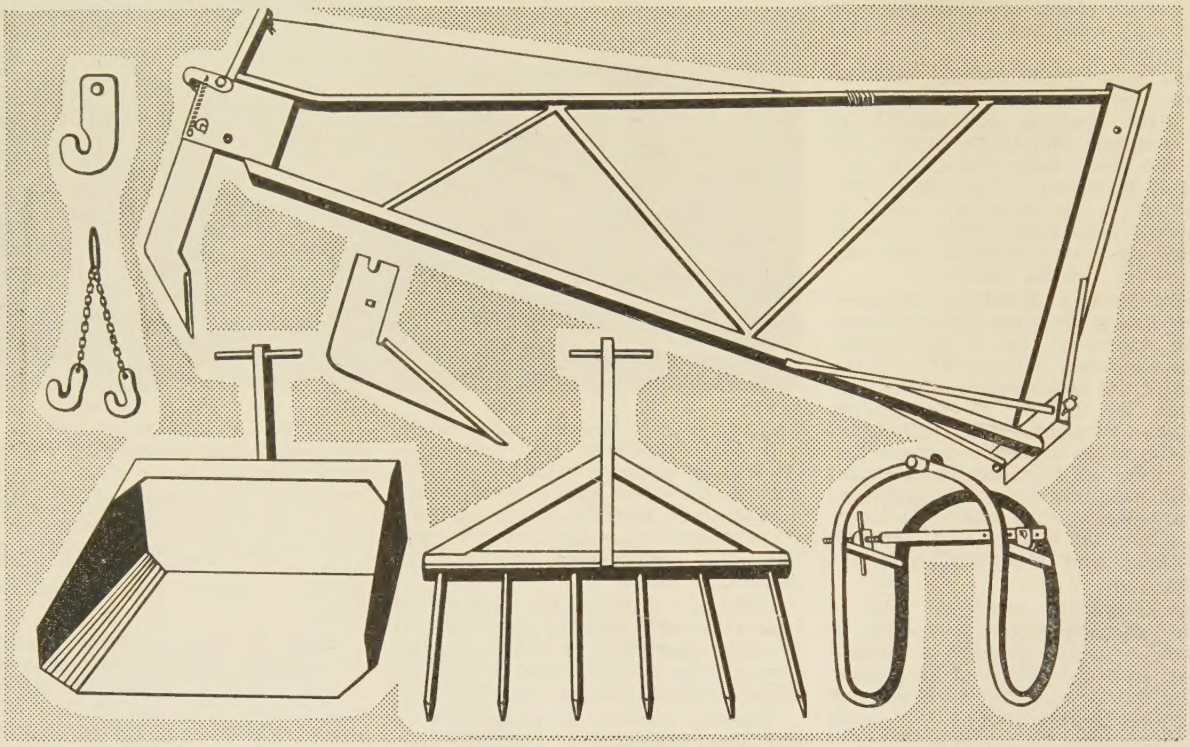

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could affect incidence of cotting. Twice yearly shearing over two seasons at the Hill Station on a mixed age and a two-tooth flock had eliminated cotting.

With twice yearly shearing wool grown in the summer and autumn would normally be free of cotts, and winter-grown second shear wool would at least have a lower percentage of cotts. Other factors influencing cotting that were revealed by the research would have to be considered with the other attendant benefits and disadvantages of twice yearly shearing.

The large upsurge of second and early shear wools appearing in Auckland wool sale catalogues was referred to in a paper by C. P. Tebb on a survey of field practice of multiple shearing, which seemed to be taking on fast. Total percentage of such wool in all auctions at centres ranged in the 1959-60 season from 36 in Auckland to 11 in Invercargill. Ruakura evidence of improved lambing percentages from two-tooth ewes second shorn just before mating was undoubtedly responsible for some of the great increase in second shearing.

Results of two years' experimental work at Ruakura on the effects of shearing mature ewes more than once a year were summarised in a paper by G. C. Everitt. A slight but favourable effect on the growth of the fat lamb resulted and an extra third of a pound of wool was produced, which in one year brought a better price than, and in the next year the same price as, one-year wool.

Summarising his paper on the trade viewpoint on multiple shear wool, H. F. W. Brown said the North Island crossbred clip is rapidly being spoilt by the rapid growth of the practice. In the South Island the practice is growing too. Over-production of any one commodity must have an effect on the price, and this must happen in the very near future.

That a very large number of farmers must be interested in the outcome was evident on the field day when the Station woolshed was continuously packed to see demonstrations on the handling of short wools.

Beef Cattle Production: How best to supplement the meat production of the sheep farmer by additional beef was discussed in a paper by R. H. Bevin, who said the opening up of the North American market offers scope for disposal of beef in boned-out and cartoned form and directed attention to the possible value of crossbred beef produced as a by-product of dairying, the potential of which had been demonstrated by Ruakura.

Surveying trends in the production and marketing of beef and veal, G. C. Everitt said that producer interest has been focused much more intensely on the weight, shape, and especially the composition in terms of muscle, fat, and bone of the beef carcass.

The marked trend toward prepackaging of boneless meat means that the producer will have to place much greater emphasis on the content of lean meat or muscle in the animal, the distribution of this muscle, and, not least, the fat content. Traditional concepts of conformation in the meat animal may have to be altered. A future criterion of meat production success might not be confined to carcass weight produced per acre, but might extend to the yield of edible meat, or even the yield of best quality cuts per acre.

Bloated Capitalism ?

THE effect of bloat on production can be illustrated by the case of a farmer at Shannon. His herd consists of 120 cows and his annual losses from bloat average 20 a year. In the spring of 1960 his returns were 350 lb of cream daily. When consistent bloat hit his herd, production dropped to below 200 lb of cream daily. When his farm was visited on 19 October, 60 cows were badly bloated. On 20 October he started spraying, and within two weeks his production was up to 375 lb of cream a day. Since then he has lost no cows, and bloat has been completely controlled by spraying with heavy paraffin.

If his losses are calculated in terms of butterfat at 3s. per lb, his daily production loss from bloat was £26 and his annual loss of animals about £700. Against this his cost of spraying involves a capital expenditure of, say, £60 and a daily cost of 2½d. per cow per day; that is, £1 5s. plus about an hour of his time. On the credit side, also, must go peace of mind, the opportunity to do other farm work, and a good night's sleep.

—A. T. JOHNS to the Ruakura Farmers' Conference

Factors affecting carcass composition that were reviewed in the paper were demonstrated at several points on the field day: at the cattle yards the importance of selecting beef bulls for weight gain characteristics was illustrated; at the abattoirs effects of management on proportions of edible parts of the carcass were shown in whole and broken-down carcasses; and at the Meat Research Institute the end products in a wide range of prepacked boneless cuts attracted wide interest.

Crossbred Beef: Despite the potential and advantages of producing crossbred beef from dairy cows that have been demonstrated by Ruakura, the practice has not been adopted to any marked extent by dairy farmers, J. C. Gerring told the conference. Ways of countering some of the implied reservations of farmers were suggested from Ruakura experience.

The outlook for beef is brighter than it is for butter, and the production of crossbred beef or veal has a number of features that make it an attractive proposition. Very little extra finance is needed. The raw material in the form of 1½ million surplus calves is bred each year. Most farmers have adequate facilities for rearing and handling calves. The returns for the additional capital invested and labour expended are high.

As a method of taking up the untapped production potential on a large proportion of dairy farms it could provide a welcome and necessary addition to farm income without further embarrassing the export dairy products supply.

A project that attracted keen interest on the field day as bearing on the crossbred beef proposition was that in which the milk production of beef cows is being measured.

The herd of two-year-old heifers, all calved down to Aberdeen Angus bulls, comprises 10 Aberdeen Angus, 10 Hereford x Aberdeen Angus, and 5 Aberdeen Angus x Jersey. Calves, after running with their mothers for three days after calving, were then separated from them and thereafter weighed night and morning, suckled by their dams, and then weighed again, differences in live weight being taken to represent milk consumption.

At their peak of production the Aberdeen Angus were producing 10 gallons per week, the Hereford x A.A. 11, and the A.A. x Jersey 14½. Mean weaning weights of calves were respectively 420 lb, 447 lb, and 513 lb. Ten Aberdeen Angus x Friesian heifers are to be added to the experiment this season.

For Dairy Farmers

Bloat: Administration of antifoaming agents has proved the only completely reliable method of prevention and treatment of bloat, A. T. Johns told the conference, and spraying of emulsified oil or tallow on pastures is completely successful if carried out properly. Where it has not proved a complete success, something has invariably been found wrong with the farmer's technique. By far the most common cause of failure is that a proper emulsion is not formed.

Pasture spraying is not, however, considered the ultimate in bloat control, and further research is being undertaken to determine the factors that combine to produce bloat.

Foam in the rumen appears to be due to some product of microbial digestion, which can vary from animal

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to animal, and to some foam stabilising constituents released from chewed plant material.

When more is known about the constituents that make up the stable foam, a simpler method of control may be hoped for.

Proper methods of emulsifying spray materials were demonstrated throughout the field day.

Pros and Cons of High Stocking Rate: In what has become a tradition of the best Ruakura conferences, No. 2 Dairy, where in 15 years six major cattle studies with differences in stocking rate as the major or only variable have been completed, was a centre of interest on the field day, and Dr McMeekan, in the General MacArthur manner, returned to the conference platform with a provocative paper on the work.

Describing Ruakura experiments to show that there is a limit to which stocking rate can be increased with corresponding increases in per acre yield, Dr McMeekan said that the most practical observation is that the point at which stocking rate will break down appears to be reached earlier under set stocking than it is under controlled rotational grazing.

Ruakura has not so far been able to "bust" high stocking under controlled grazing at No. 2 Dairy. The high rate controlled farm, carrying 42 milking cows on 33½ acres, has been the highest producing of the four over the past four years. Its output has averaged 485 lb of fat per acre and in one year broke the 500 lb of fat barrier with an average of 522 lb of butterfat per acre at the pail.

In contrast the high rate set stocked farm has produced little more than its low rate counterpart over the four years, and has fallen below it over the last two years by 11 lb of fat per acre.

The stocking rate is one of the controllable weapons farmers can use to help them attain high levels of efficiency, but they should be sensibly cautious in using it. They should increase gradually and ensure that adequate reserves of hay and silage are at hand to take care of the increased numbers.

Measuring Milk Yield: A new milk meter to measure the milk production of individual cows that has been developed incidentally to the development of milk flow recording apparatus at Ruakura was demonstrated at No. 1 Dairy on the field day and described in a paper by D. S. M. Phillips.

The meter and the new improved Ruakura milking machine may have survived the field day, but they were so festooned by farmers then that they were neither seen nor heard by this observer.

Quoting Mr Phillips, "the meter has been designed to operate between the cow and the milk line of the machine so that it meters the milk as it passes into the line. The weight of milk is shown in pounds on a dial. At the end of each cow's milking the total weight of milk can be read off the dial and the numbers returned to zero for the next cow. If the farmer does not wish to read the meter, he can ignore it and the cows will continue to milk through it in the normal way. Because it meters the milk continuously, there is no need to wait for draining, and the cups can be placed on another cow immediately."

Feeding Calves Every Other Day: Continuing its search for ways of further increasing the efficiency of calf rearing, from birth to weaning in particular, Ruakura has turned attention to the possibility of reducing both the amount of milk fed and the time spent in feeding.

Twenty sets of identical twin heifer calves were bucket fed whole milk once a day at 7 pints per calf until each had reached about 80 lb live weight. One member of each set was then fed 7 pints once daily as before and its mate had 8 pints only once every second day. Each was weaned at 120 lb live weight. All calves were rotationally grazed throughout as a single group.

Calves fed only once every second day grew slightly less rapidly than their mates. Their average weight when their mates were weaned at 120 lb was only 114 lb, but at 8 months the difference was only 3 lb, and their 12 fewer feeds and 70 pints less milk per calf represented the saving in labour and costs.

Read All About It

A COPY of the "Proceedings" of the conference, with full text of papers and summaries of discussion, will be posted to all those who registered and paid the conference fee at Ruakura. Orders (10s. per copy, post free) will be taken at Publications Section, Department of Agriculture, Box 2298, Wellington, or at the Ruakura Animal Research Station, P.B., Hamilton, up to the time of going to press in a month or so.

Selenium and Animal Health

Describing widespread recent investigations into the incidence and control of selenium deficiency, W. J. Hartley said that research workers had recognised in New Zealand all the recorded selenium-responsive diseases of livestock, and several that have not been described elsewhere.

The investigations show that such diseases are widespread throughout the country and that they are of considerable economic importance, particularly to the sheep industry.

As the food and drug regulations in many countries stipulate that foodstuffs must contain no selenium, immediate investigations are concerned with finding the least amount of selenium needed to prevent and control the diseases.

By doing this and controlling the sale of selenium, it should be possible to restrict the selenium content of animal tissues to the normal.

Soil Fertility

Papers reporting investigations into the influence of the animal on soil fertility were presented by H. G. Hopewell and D. E. Hogg of the Rukuhia Station; and on phosphate utilisation and maintenance by J. Karlovsky of Rukuhia.

Weed and Insect Control

Recommendations for weed control in crops, drains, and pastures were made in a paper by F. B. Thompson of Rukuhia, and J. E. Bell, in a paper on control of insects in pastures, emphasised that methods of control are being reviewed because of residue hazards in export products through the improper use of some insecticides.

Strength from Adversity?

Two years ago Dr McMeekan closed a Ruakura conference on a note of doubt about the Station's capacity to continue to provide something new for the sort of Farmers' Week that was apparently expected. Last year the day of mixed papers for all farmers was abandoned. This year's conference, with the restoration of the four days and the fuller participation of the Rukuhia Soil Research Station, indicates that Dr McMeekan may have accepted the obligation to continue to provide annually "something old, something new" from Ruakura.

He especially acknowledged at the close of this year's conference the little that was left to him to do by Mr J. C. Gerring of his staff, who was mainly responsible for its organisation.

The pattern that has been developed of short papers, ample time for farmer participation to the full in spirited discussion, a broad, practical, and often provocative range of subjects, and a highly organised field day amplifying and demonstrating the practical application of research subjects discussed in papers, obviously has a tremendous and increasing appeal to farmers. A great deal of the influence of Ruakura that is being detected in field surveys of farm management must be implanted first at the Farmers' Conference Weeks.

Care of Livestock during September

By Wallaceville and Ruakura Animal Research Stations

SELF-FED SILAGE

SELF-FEEDING of silage has been practised at Ruakura over the past three years. Results have been highly satisfactory. It is a labour-saving technique which could well be more widely practised on both beef and dairy farms. Farmers planning to try out this system should complete preparations now. The site chosen should provide access to the silage from several paddocks so that it can be fed as a supplement to pasture. On dairy farms the ideal site is alongside the race.

On most soil types a concrete base for the silage and a 12 ft-wide feeding platform for the stock are essential to avoid mud. This may take the form of a permanent floor or be made up of prefabricated slabs which can be easily handled with the hydraulic rear- or front-end loader on the tractor.

Adequate provision must be made for the drainage of the effluent from the silage, preferably away from the feeding face.

To avoid wastage in feeding, the finished or settled height should not exceed 5 ft 6 in. Where cattle are to have continuous access to the stack the length of the feeding face should provide about 6 in. per beast. If access is to be restricted to less than 4 hours per day, at least 2 ft per animal will be necessary.

Observations indicate that dry in-calf Jersey cows self fed on a sole diet of silage will eat approximately 15 to 20 lb of silage per hour, consuming a total of about 80 to 85 lb per day or just over a ton per month. On such a diet liveweight gains of from 5 to 10 lb per week have been made. Rising 2-year-old steers self-fed silage as a supplement to autumn-saved pasture ate about 33 lb of silage a day (.44 tons a month) and made similar liveweight gains to those of a comparable group fed pasture plus hay. Depending on its moisture content silage weighs about 45 to 55 lb per cubic foot.

DOCKING AND AGE-MARKING LAMBS

Losses due to excessive bleeding, blood poisoning, tetanus, and mismothering are some of the more important hazards associated with docking. These can be avoided by taking a few simple precautions. Dock the lambs in small mobs using a temporary pen set up in a clean grass field. Muster the ewes and lambs quietly and let them settle down before starting operations. Use sterilised instruments and keep them in an antiseptic solution when not in use. Finish the job in adequate time to allow ewes and lambs to mother up before dark.

The uniform age-mark for 1961 is two notches on the upper part of the ear.

VACCINATION OF LAMBS

Losses from pulpy kidney in lambs six weeks of age or over can be prevented by vaccinating the lambs at docking and again three to four weeks later. Protection from tetanus can also be obtained by injection at docking with tetanus antiserum.

If scabby mouth has occurred on a property, it is liable to recur. Vaccination at docking will prevent this disease. The vaccine is scratched on to the surface of the bare skin, inside the thigh, with a special sharp-pronged needle. Because the vaccine is a live one, no antiseptic can be used to sterilise the skin. Make sure the needle holds a "web" of fluid before each scratch. After making each scratch jab the needle into a plug of cottonwool to clean it before reloading; otherwise grease and other debris will prevent a full dose being given. Each lamb should be given two strokes. A successful "take" is indicated by scab formation at the site of scratch in about 10 days.

FATTENING CATTLE

During winter it is often necessary to provide a bare maintenance level of feeding to the older cattle to give preference to the weaners. With the onset of spring these roles can be reversed. Though September is frequently a difficult month, every effort should be made now to give the older fattening cattle the best feed available to have them finished and off the farm by next autumn. They may be set-stocked, a few in each paddock, among the ewes and lambs, while the yearlings are grazed as a mob through paddocks in need of control.

FOSTERING CALVES ON RUN COWS

It is not generally appreciated that calves can be fostered as easily as lambs. If the skin of the dead calf, including the ears and tail, is put on the calf to be fostered, it will generally be readily accepted by the cow. With the more widespread use of beef bulls on dairy cows it is not difficult to get suitable calves for this purpose.

DON'T WASTE COLOSTRUM

On farms where no pigs are kept, a surplus of colostrum or first-milk is likely to be available. This should not be wasted. It is a highly digestible food, rich in protein and in vitamins A, D, and E. Very young calves fed as much as 2 gallons daily gained nearly 3 lb body weight per day.

On this basis the feeding of colostrum to bobby calves a few days longer than usual would return nearly 1s. per gallon.

Excess colostrum can also be fed quite safely to older calves. Where this is done it should be diluted with one-third its volume of water.

EPIDIDYMITIS OF RAMS

Brucella ovis infection (epididymitis) is an important cause of ram wastage. An effective vaccine is now available for use by veterinary surgeons for the protection of rams against this disease. Young rams may be vaccinated at any age from four months until two months before the beginnings of their first tupping season. Vaccination as yearlings rather than at an earlier age will give better protection. Older rams should be examined by a veterinary surgeon and rams with clinical lesions of the disease culled. The remainder of the rams may be vaccinated either immediately or later at any time until two months before the beginning of the next tupping season.

Seasonal Notes

By Farm Advisory Division

PROTECTING BEES FROM CROP SPRAYS AND DUSTS

THOSE who apply insecticides to crops and seed-producing areas during spring and summer are subject to obligations and responsibilities under the Apiaries Protection Regulations 1957. The regulations relate to insect pest control measures applied to any cruciferous or leguminous crops in flower or to any such crops containing flowering plants (not necessarily crop plants) in sufficient quantities to attract foraging bees. From 1 September to 31 March it is an offence to dust or spray such crops with materials toxic to bees without a permit.

Crops most likely to be concerned are brassica seed crops subject to aphid infestations or clover seed areas suffering from case-bearer moth attack. There is no satisfactory field treatment for case bearer, so application of insecticides to control this pest is unwarranted. Aphids on brassicas can be controlled, but to avoid injury to foraging bees, a systemic insecticide should be applied in August before the crops flower and before the regulations apply.

If spraying has to be done in the period covered by the regulations and a permit becomes necessary, apiarists in the vicinity are entitled to 72 hours' notice of intent to spray or dust crops so that they may protect their colonies of bees. Applications for permits should be made at least five days before crop treatment is intended.

Risk of harming foraging bees can also be avoided by confining spraying and dusting to late afternoon or evening or to dull days, when field activities of bees are lowest.

Applications for permits should be made to the local office of the Department of Agriculture.

—A. R. DINGWALL, Christchurch

* * *

PREPARATION OF LAND FOR NEW GRASS

SPRING-SOWN pastures usually follow brassica crops, which should be fed off early so that older pastures can be conserved for early spring use. Early sowing favours a good strike of the grasses and often helps appreciably to suppress weeds.

Good consolidation is essential, but becomes increasingly important with later sowings, because then seedbeds are very prone to rapid drying out, often resulting in high seedling mortality. Good consolidation also gives the pasture plants a better chance of competing successfully with weed growth by promoting favourable soil conditions for development of grass roots. Deep working to cover uneaten stalky chou moellier results in loose, open seedbeds that are very difficult to consolidate without heavy rolling.

The seed should be sown on a surface rolled with a Cambridge roller and harrowed in. Under most circumstances it is better to roll again after sowing, because the seeds strike and establish better if the soil is pressed firmly round them. Seed should be evenly spread, for once it has reached the ground it is practically impossible to improve the distribution by harrowing, even if several strokes are given. When normal equipment is not available sheep can be used to tread the seed in and consolidate the seedbed, but thorough coverage is essential for good results.

Precision methods of sowing (V-roller drilling and 3½ in. drilling) whereby the seed and fertiliser are sown together in rows at a uniform depth below the surface have much to commend them and often allow a substantial reduction in seeding rate.

Information on fertiliser requirements and pasture mixtures for your own locality can be got from the nearest office of the Department of Agriculture.

—L. W. BLACKMORE, Dannevirke

* * *

SPRING MANAGEMENT OF LUCERNE

MISMANAGEMENT in spring is the most common cause of rapid running-out of lucerne stands in Central Otago. Lucerne relies on its rapid, tall growing habit and its drought resistance to beat competition from other plants. If this competitive ability is interfered with, the lucerne almost invariably suffers, particularly in spring, when moisture is adequate and drought resistance of little value. The practice of keeping lucerne short in early spring until haymaking weather is more reliable is therefore acting directly in favour of the undesirable plants.

Lucerne should be spelled from the time growth begins until the early hay stage so that it has every chance of smothering out potential competitors. Ideally, growth in this first period should be cut for hay. Alternatively, if the weather is not suitable for haymaking, the first cut can be made into silage, as farmers in Otago have done for several seasons. If it is necessary to graze the stand, it should be allowed to reach an early hay stage before stock is put on it. Enough stock should be used to graze the lucerne down quickly. It should then be spelled again. Under this system stands have been kept in high production for 14 years with little deterioration.

—A. A. DUNCAN, Alexandra

* * *

TOPDRESSING FOR COCKSFOOT SEED PRODUCTION

FOR good cocksfoot seed production adequate nitrogen is needed. The first seed harvest is usually quite good and the stand can utilise nitrogen accumulated from clovers or from a previous crop and from animal residues. After the first harvest a heavy accumulation of dead straw and leaf in the stubble stops the growth of clover and so cuts off the nitrogen supply to the crop. Grazing of the stand or feeding out on it is not regarded favourably, as the stand is often weakened, weeds come in, and less seed is obtained if grazing is heavy. There is therefore no alternative to supplying nitrogen by topdressing with nitrogenous fertilisers.

Yields of machine dressed cocksfoot seed may be doubled by the use of nitrogen. Superphosphate and lime have little influence on seed yields. For best results apply 1 cwt of sulphate of ammonia per acre in autumn and 2 cwt of sulphate of ammonia in early spring. In Southland autumn applications are made in April and spring applications in early September. Do not make late spring applications, as this results in abundant leaf growth but no increase in seed production.

—T. G. SEWELL, Gore

Death and Gift Duties

SINCE the article about death and gift duties on page 161 of this issue was prepared the Budget presented to Parliament last month announced substantial changes.

Rates of duty have been reduced and the new scale provides that gifts totalling up to £1,000 made in any one year will not attract gift duty. The previous limit was £500. The limit of £50 for small gifts made as part of a donor's normal expenditure is raised to £100.

Under present legislation there are allowances for a widow's and widower's succession and the succession of an infant child of a deceased, but these allowances disappear when the value of the estate reaches £60,000. The allowances will in future apply to the whole range of estates.

The estate prepayment scheme, which was introduced last year, is to be repealed, but the rights of persons who made prepayments before 21 July 1961 will be preserved.

The tables in the article should now be as follows:

DEATH DUTIES

Dutiable estate value	Duty payable	Percentage of estate
£	£	
2,000	Nil	—
3,000	60	2.0
3,100	66	2.1
5,000	200	4.0
10,000	900	9.0
15,000	1,880	12.5
20,000	3,000	15.0
25,000	4,380	17.5
30,000	6,000	20.0
40,000	9,340	23.4
50,000	13,340	26.7
100,000	40,000	40.0

GIFT DUTIES

Value of gift	Gift duty payable
£	£
1,000	Nil
2,000	95
3,000	185
4,000	295
5,000	425
6,000	575
7,000	745
8,000	935
9,000	1,145
10,000	1,375
15,000	2,605
20,000	3,975
25,000	5,605
Over £30,000	25 per cent less £25

Meteorological Records for June

Station	Height of station above M.S.L. (ft)	Air temperatures in degrees (Fahrenheit)				Rainfall in Inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	240	54.0	+1.9	68.5	38.8	13.01	19	+5.6	5.40	12	122
Auckland	160	53.8	+0.8	65.3	39.0	10.81	21	+5.3	3.11	13	110
Tauranga	12	50.3	+1.6	66.0	30.3	8.23	22	+3.2	2.08	13	107
Ruakura	131	48.8	+1.3	64.9	28.7	7.99	25	+3.4	0.93	13	89
Whakarewarewa	1,006	46.8	+1.5	61.9	27.8	5.91	19	+0.0	1.44	8	91
Gisborne	14	50.0	+1.2	66.1	32.6	5.85	12	+2.0	1.68	8	133
New Plymouth	160	50.8	+0.7	63.7	34.0	6.62	20	+0.2	1.30	13	94
Karioi	2,125	41.8	+0.3	59.5	26.6	7.04	20	+2.4	0.83	28	—
Napier	5	49.7	+1.0	71.0	30.8	6.59	12	+3.5	2.36	23	133
Wanganui	72	49.0	+0.2	63.6	31.9	3.71	17	+0.3	0.77	23	107
Palmerston North	110	48.0	+1.0	66.9	29.2	2.88	13	—1.0	0.59	4	97
Waingawa	340	45.2	—0.2	63.1	26.5	3.81	15	—0.2	1.12	23	127
Wellington	415	48.2	+0.5	62.7	34.6	3.05	15	—1.8	1.17	23	128
Nelson airfield	5	43.7	—0.4	61.1	26.6	1.84	13	—1.3	0.40	4	138
Blenheim	14	45.1	+0.2	67.8	27.7	0.94	9	—1.4	0.19	4,19	171
Hanmer Forest	1,270	37.8	—1.9	63.0	19.0	5.60	12	+2.1	1.15	27	106
Hokitika South	15	44.1	—0.2	57.5	28.0	9.93	15	+1.9	1.53	19	114
Christchurch	22	42.8	—0.4	69.9	24.3	1.03	8	—1.7	0.71	3	154
Ashburton	323	42.1	+0.3	67.2	21.8	2.17	6	—0.2	0.86	23	156
Timaru	56	42.1	—0.3	66.1	26.2	1.67	6	+0.1	0.84	3	148
Alexandra	520	35.5	—2.2	61.0	14.0	0.89	13	+0.1	0.13	26	113
Taieri	80	41.4	—0.4	62.2	22.4	1.21	11	—1.2	0.49	27	111
Invercargill airfield	0	41.8	+0.2	56.4	28.0	5.02	23	+1.1	0.63	25	68
Chatham Island	150	46.8	+0.3	56.9	35.1	3.21	25	—0.7	0.93	28	75

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during May 1961 and for the 10 months ended 31 May 1961 with comparative figures for the same month and the 10 months of 1959-60 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
May 1961	2,208	152	2,360	—
May 1960	2,926	110	3,036	—
Increase or decrease	—718	+42	—676	—22.266
10 months ended 31/5/61	161,444	3,171	164,615	—
10 months ended 31/5/60	158,390	2,962	161,352	—
Increase	+3,054	+209	+3,263	+2.022

Butter in store at 31 May 1961 was 28,972 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage increase
May 1961	4,420	668	5,088	—
May 1960	3,694	239	3,933	—
Increase	+726	+429	+1,155	+29.367
10 months ended 31/5/61	79,968	12,280	92,248	—
10 months ended 31/5/60	75,063	11,316	86,379	—
Increase	+4,905	+964	+5,869	+6.794

Cheese in store at 31 May 1961 was 23,539 tons

If these figures are converted into butterfat equivalent, there is an increase of 2.949 per cent in butterfat graded for the 10 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export and do not include butter and cheese used on the local market and other products such as anhydrous milk fat, whole milk powder, and other whole milk products, and are not necessarily a true indication of production trends.

Maize Growing for Grain

By H. de O. CHAMBERLAIN,
Farm Advisory Officer, Department of Agriculture, Gisborne

MAIZE is the highest yielding of all cereal crops grown in New Zealand. Under suitable soil and climatic conditions it is also one of the safest crops, producing upward of 120 bushels and a gross return of over £60 per acre. It is estimated that the produce of 15,000 acres of maize can be used annually in New Zealand for stock food, yet over the 10 years preceding 1958-59 an average of about 6,000 acres was grown, a drop of about 2,000 acres from the preceding 10 years. In the 1958-59 season fluctuations in prices for animal products and livestock caused an increase in the Dominion's maize acreage to about 9,100 and in 1960 11,500 acres were sown.

HEAVY crops of maize cannot be grown everywhere in the country, but there is considerable scope for an increase in acreage in districts which can provide the main requirements of the crop. These are fertile, well drained soils, a long frost-free growing period (from October to late April), and a soil which warms early in spring to give the seedlings a good start. These conditions are found in Hawke's Bay, Poverty Bay, Bay of Plenty, and parts of Auckland and North Auckland.

Crops of maize for grain can be grown in fertile soils in less favourable climates by the use of hybrids which mature early. These yield less than the types used in warmer places, but are capable of 60- to 70-bushel average yield.

Climate and Soil

Maize is a heavy feeder and should be given the richest and best drained paddock available. Poor soils will not produce good crops, even if heavily manured. River flats are ideal, but other well drained and fertile soils such as night paddocks on dairy farms and well drained swampland can produce heavy crops.

The area should preferably be frost free from October to the end of April or at least subject to autumn frosts of not heavier than 8 degrees. After April, when cobs are mature, heavy frosts will help rather than hinder the harvest.

Aspect of land and protection from wind have some bearing on production of the best crops, but good drainage is the only really important factor other than rich soil. Good drainage allows the soil to warm quickly in spring, reduces losses of seedlings, and helps to maintain suitable conditions for harvesting by machinery in autumn and early winter, eliminating undue delay after heavy rain.

Maize is grown in districts where general cropping is not done regularly, and specific rotations are not recognised. However, as fertility must be high for maize to grow well, it is a good crop to sow in an old paddock broken up after being well stocked for years.

It is sometimes said that maize does not produce its best crop immediately after grass, but yields most as a second crop in these circumstances. This belief probably arose from results achieved with the practice of ploughing out of pasture in August or September for planting in October or November, but there is a growing realisation that autumn-ploughed pasture gives highest results.

Successive crops used to be grown for 15 and 20 years in the same paddocks and still yield reasonable crops, even though soil texture was ruined and cultivation costs were higher each year. With maize being grown on more farms, the introduction of diseases, and the use of hybrids less disease resistant than open-pollinated varieties, no paddock should carry maize for more than three successive seasons.

Maize can be grown after grass, peas, beans, pumpkins, chou moellier, turnips, or swedes, but is best grown before other cereals, as these tend to harbour and increase some disease spores which can severely injure maize.

In maize growing districts where canning plants operate it is sometimes possible to arrange a contract for early peas and to follow up straight after with a crop of maize, thus gaining an extra crop in one year from the same paddock. If these two crops are to be grown, one of the more rapidly maturing types of maize should be used.

This article will be concluded in next month's issue with information on harvesting and storage, seed, and diseases and insect pests.

Preparation of Seedbed

In preparing a seedbed for maize the aim should be the best possible tilth by the time the seed is to be sown. This entails thoroughness in every operation of cultivation. Thoroughness in its turn calls not only for efficiency in the actual performance of ploughing, discing, harrowing, and other working, but provision of ample time for full benefit to be drawn from each phase of cultivation. If ploughing is delayed until a week or two before sowing, the consequent hurried and inefficient after-cultivation will result in inevitable loss of germination, slow initial growth, and loss of seedlings.

Grass paddocks should be heavily disced about April to cut the turf and give it a chance to die. Three weeks should elapse before ploughing to encourage the germination of any weed seeds on the surface. Deep ploughing (up to 6 in.), should follow and the land be left up to mellow during winter. If the area was in maize the previous season, the stubble should, if possible, be burnt with a flamethrower to reduce its bulk and destroy fungous spores. This is neither difficult nor onerous, as maize leaves dry quickly after rain in even a light breeze. Deep ploughing should follow immediately and the land left to fallow.

As early as possible in September the land should again be ploughed (to a depth of at least 4 in.) and disced to a reasonable tilth to allow weeds to germinate. Rollers should not be used on heavy land; cultivators, harrows, and discs should be used to gain the necessary fine tilth to the full extent of the plough depth. For the last two to three weeks before sowing harrows only should be used to control weeds and gain consolidation.

No amount of cultivation after the crop is sown can make up for deficiencies in the preparatory work. In fact, if the seedbed is cloddy or trashy,

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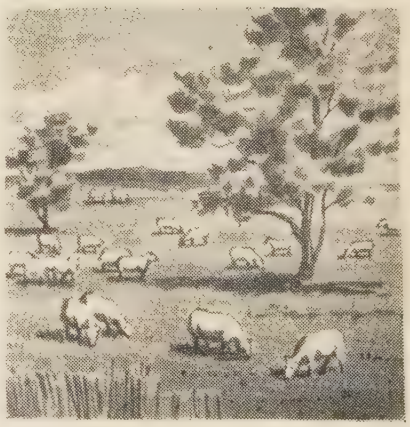

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efficient harrowing after the crop is sown becomes impossible.

Time and Rate of Sowing

Irrespective of district the time to sow is governed by the weather. Generally from October to mid November is best, but sowing in cold, wet soil will certainly reduce germination and increase seedling loss through disease. Moreover, crops sown under these adverse conditions will not ripen significantly sooner than those sown later when soil warmth and soil moisture are right. If cultivation has been well done and the seedbed is fine and firm, the soil will not dry out below a depth of 2 in., which allows plenty of moisture for seed planted 4 in. deep.

Seeding

Throughout the maize growing districts the rate of seeding varies between 12 and 18 lb per acre, the average being 14 lb or a bushel to 4 acres. However, if the soil is in good condition for sowing, both as regards warmth and tilth, 12 lb is ample unless the seed is very large.

Seed is sown in rows from 30 in. to 3 ft apart, depending chiefly on the type of planter used. The closer sowing is recommended, since it gives ample width for cultivation and root development and gives a higher plant population and therefore a higher yield per acre.

Seed is dropped 9 in. apart in the rows. To achieve this care must be taken to fit the right plates to the machine for the size of seed to be sown.

Seed size is likely to vary from year to year and with variety, and usually two or three grades or sizes are sold. This can cause patchy establishment or too thick planting if the same plates are used.

Manuring

On the Gisborne plains at present no fertiliser is sown with maize, and experimental work shows a depression in yield after application of superphosphate.

There is, however, a marked increase in yield where a green crop is sown in early autumn or immediately after the previous crop has been removed. This crop can usually be fed off once by stock and should be ploughed in at the end of July or early August when plants are at least 6 in. high.

If green material is ploughed in late, it will not rot completely and a nitrogen deficiency may result. To assist the speed of rotting, the crop should be thoroughly disced before ploughing to bruise the stems and mix the chaff as thoroughly as possible with the topsoil.

Oats and tares (2 bushels of oats and 1 bushel of tares per acre) are the recommended green crop, since it not only gives a large bulk of quickly grown leafage but the tares supply nitrogen to the soil. Sweet blue lupins can also be used (at 2 bushels per acre) where this crop can be relied on to grow well when autumn sown.

A 4-row maize planter.

The growing of green manuring crops not only increases yield by exercising control over soil temperature and moisture, but reduces the number of cultivations necessary by improving soil texture and smothering weeds. It also supplies a useful supplementary feed, sometimes when it is most needed. The practice can be recommended wherever maize is produced, particularly where successive maize crops are grown.

When 6 in. to 1 ft high maize plants should be side dressed with calcium nitrate at 4 cwt per acre.

On lighter soils in the Gisborne-East Cape area and in the Bay of Plenty and Auckland districts some fertiliser is necessary in addition to green manuring to give maximum yields. This should consist of an initial application of 3 cwt of superphosphate plus 1 cwt of muriate of potash where the soil is known to be deficient in potash. Plants should also be side dressed with calcium nitrate as mentioned above.

The nitrogen supplied by calcium nitrate corrects the deficiency often noted in maize, particularly after heavy winter or spring rains. It also prevents possible nitrogen deficiency from developing when green crops have unavoidably been ploughed in late. Nitrogen also increases yield and reduces the effect of diseases such as stalk rot.

Varieties

In the Gisborne district the most widely used varieties are the double hybrids W643 and Pfister 360, certified seed of which is produced by the Department of Agriculture. A few areas are sown with Marigold to produce seed to supply the demand for a good, leafy maize for green feed. Several directly imported hybrids, such as K3A, KO5, and KT7 are sown on about 1,500 acres.

Double hybrids are also gaining in popularity in the Bay of Plenty and Auckland districts and will be grown there increasingly as the practice of producing maize for grain expands. Until recently crops in those areas were largely grown for feeding unshelled to stock, and open-pollinated varieties, such as Early Butler, Excelsior, and Motiti, were used.

Probably about a quarter of the area grown in the Bay of Plenty is still sown to these open-pollinated varieties, and where soil is poor and light they produce better crops than the more delicate and high fertility demanding double hybrids. It is debatable, however, whether maize is the best crop for soils of that kind.

Brief descriptions of varieties follow.

Pfister 360

This is a high-producing double hybrid with an average height of 6 to 7 ft. Leaf development is fair, but stems are somewhat weak. Cobs are of medium length and well packed with small, hard grain with smooth, yellow dents. Cobs set fairly low on the stalks and as they can be husked and shelled very easily, care must be taken in handling. Because the cobs shed much grain in the crib and so fill up spaces between cobs, drying is often delayed, with a consequent increase in mould, especially in an unusually humid season. To offset the

Everything's under control . . .

What a fine figure of a scarecrow he is! Although bird traffic seems somewhat slack at the moment, who can doubt that those vast white gloves are capable of dealing with any emergency. Unfortunately, his command of the situation does not extend to the other pests of growing crops — the insects, the fungus spores and the weeds. To keep *them* under control the best weapons are agricultural chemicals from Shell.

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reduction of air movement triangular wire mesh tunnels should be spaced through the crib to give extra access to wind. The variety matures in about 180 days.

W643

This double hybrid has virtually replaced Pfister 360 because of its higher yield. Average height is 7 to 8 ft, leaf development is good, and stems are strong. Cobs are of medium length, but are very well packed with larger, though softer, grain than Pfister 360.

Cobs, which grow well up on the stems, are heavy for their size. Shelling and husking are easy if the crop is ripe when harvested. Difficulties in machine husking are always due to immature cobs. Grain does not shed from the cob in the crib, which makes crib drying easier and more efficient. The variety matures in about 190 days.

W575

By New Zealand standards this is an early variety, coming to maturity about two weeks before the imported KO5. Generally 6 to 7 ft in height, the stalks stand well and carry their cobs at a uniform and convenient level for machine picking.

The cobs are not notable for their size, but their shelling ratio is very high, resulting in more grain from the same crib space. The grain is rather squat and in bulk has a pinkish tinge.

Marigold

An open-pollinated variety used mainly for green feed, Marigold is very leafy and vigorous. Though stems are fairly hard, they tend to be brittle and to lodge in high winds. The grain is bright amber, fairly small, and flinty. Husks are very tight and though this gives cobs good protection in the worst of weather, they are very difficult to husk by machine. Cobs are long, slender, and well packed with grain. The variety matures in about 210 days.

Early Butler

Though an early maturing, open-pollinated variety, Early Butler yields well. Stems are about 5 ft high and of medium thickness. Cobs are of moderate size with very deep yellow grain. The dents on the grain are drawn out in distinct beaks, causing the mature cob to be extremely rough. For this reason it is unpopular with hand pickers. The variety husks well, but the grain is soft and susceptible to crib rot. The variety matures in about 135 days.

Excelsior

This is a tall, open-pollinated variety with stout stems that stand well. As leaf development is good, it is useful for green feed. Cobs are large and heavy with medium size yellow grain having fairly smooth dents. Husks are tight and close, which makes machine husking difficult. This variety matures in about 210 days.

Motiti

This open-pollinated variety is so called from its association for many years with Motiti Island in the Bay of Plenty. The variety has short and light stems and tends to sucker freely. The grain is very hard and resistant to ould. Yield is light and maturity is reached in about 140 days.

US13

This is a very vigorous, stiff-stemmed, high-yielding double hybrid, seed of which has been imported from the U.S.A. It grows up to 10 ft high and matures very late. The grain is very similar to that of W643, but tends to be larger and harder. For grain growing in districts where the cobs are fed unshelled direct to stock this variety may be excellent. In the Gisborne district it has been unreliable owing to its late maturity, an early and quite light frost preventing the cobs from turning downward. This allows rain to get beneath the husks and collect at the bases of cobs, causing sprouting of the grain before harvest.

K3A

A medium to late double hybrid imported direct from the United States, this variety is a leafy type with good stalks about 7 ft high which yield well. The rather short cobs are well filled. Sometimes it shells too easily when mechanically picked. The grain is slightly softer than that of Pfister 360, with a reddish tinge when viewed in bulk.

KO5

This is a fairly early double hybrid from the same source as K3A. Because of earlier maturity its yield is potentially lower than that of later types, but it has a place where late sowing is unavoidable or early harvest is desired. KO5 is fairly susceptible to stalk rotting diseases. It generally grows 6 to 7 ft high.

KT7

This is a very late hybrid also imported direct from the U.S.A. which requires a long growing season for best results. This strain is leafy with a good field appearance. It is capable of heavy yields under suitable conditions. The good sized cobs with very deep grain are often rough instead of smoothly dented. Grain shells off fairly easily. Plants are generally 7½ to 9 ft tall.

Yields

The Dominion average yield is 65 bushels per acre, but in the Gisborne district the average is 100 bushels because of more efficient cultivation and weed control and use of double hybrid seed. Individual yields have been as high as 170 bushels per acre and there is no doubt that with even greater attention to cultural methods average yield in Poverty Bay could be raised at least 20 bushels per acre.

Weed Control

In a normal season in a good seedbed maize takes from 8 to 10 days to come through the ground. Weed seedlings germinate much more quickly and by the time the maize is up thousands of them are above ground and many more follow.

Harrowing

Some farmers still harrow maize crops a few days before the maize emerges and again after it is up. Unless conditions are perfect for this operation, however, it is largely a waste of time.

A good kill of weeds will not result if the soil is wet at time of harrowing or contains even quite small quantities of trash, which builds up on the points of the tines and damages young maize plants.

Spraying with weedkillers is more effective than harrowing. It should be done as soon as the rows of maize can be clearly seen. It is generally the weeds which germinate before and at the same time as the maize which affect maize growth and therefore the yield. If maize is sprayed as early as possible all existing weeds are killed and germination of weeds that have not emerged is prevented or considerably delayed. By the time the next crop of weeds comes through, the maize is too far advanced to come to much harm.

Harrowing of maize can be justified only where barnyard grass (*Echinochloa crusgalli*) is present. This weed has not yet been found to be controllable by sprays which can be used on maize, but harrowing as soon as the maize rows are visible considerably checks the weed. There are, however, some sprays which do show promise in the control of barnyard grass. These must be tested further.

Spraying

Hormone weedkillers have made unnecessary the expensive hand hoeing which growers were once forced to do, but these sprays must be mixed and applied carefully.

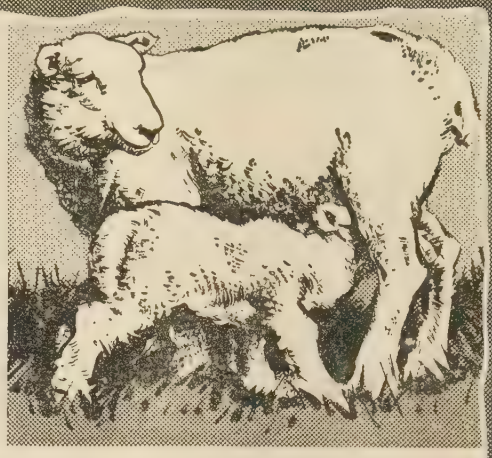
However, it cannot be too strongly emphasised that late and inefficient preparation of the soil before planting will reduce the effectiveness of weed control by spraying or any other method.

Spraying should be done as soon as the maize can be seen plainly in the rows, certainly before plants exceed a height of 6 in. The earlier weeds are sprayed, the more efficient will be the kill and the less likelihood there will be of any damage to the maize plants.

Dose LAMBS on the MOTHER

...and watch them fatten faster, with...

Monekil 'S'



By dosing suckling lambs on the mother with MONEKIL "S", you can protect them against stomach and tapeworms that may be picked up before weaning. Lambs without worms fatten faster—therefore it *must* be beneficial to dose with MONEKIL "S" and remove stomach and tapeworms as early as possible!

MONEKIL "S" is 100% effective against tapeworms, and owing to its formulation *there is no danger of costly wool staining.* The small MONEKIL "S" tablet fits the ordinary dosing gun, and is entirely SAFE with lambs over six weeks old.

PULPY KIDNEY—Tapeworms share sheeps' food and damage intestinal tissues. They are suspected of increasing the incidence of PULPY KIDNEY by delaying the passage of food through the intestines. Dosing your sheep and lambs with MONEKIL "S" definitely kills tapeworms—reduces chances of PULPY KIDNEY infection.

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Pampas can stand two good grazings each year—an obvious advantage over hay and ensilage—and a special asset if a supplementary Summer feed is required.

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Yes, you'll be proud of your herd when they come through the Winter months with fine, sleek coats, in truly excellent condition for calving—and thankful, too, for the day you planted Pampas.

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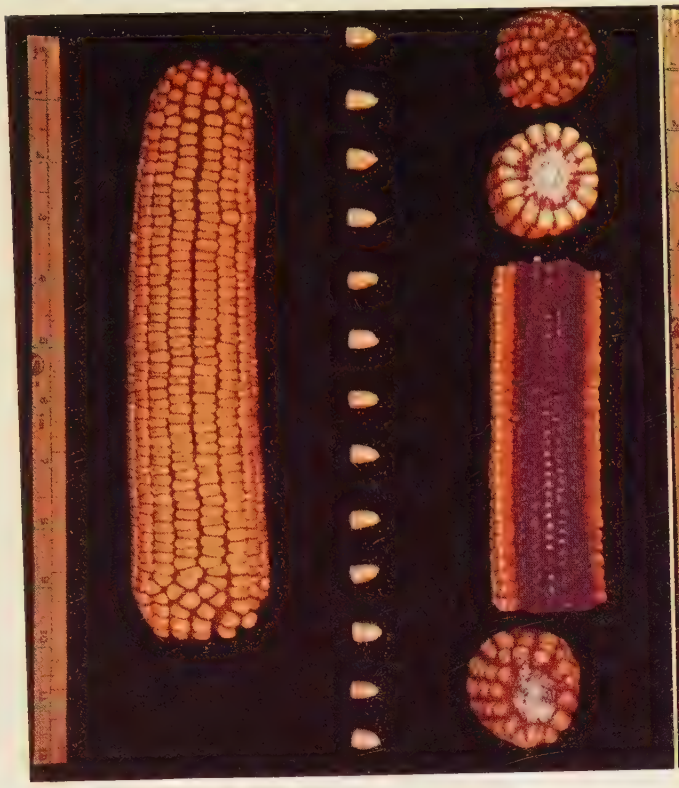

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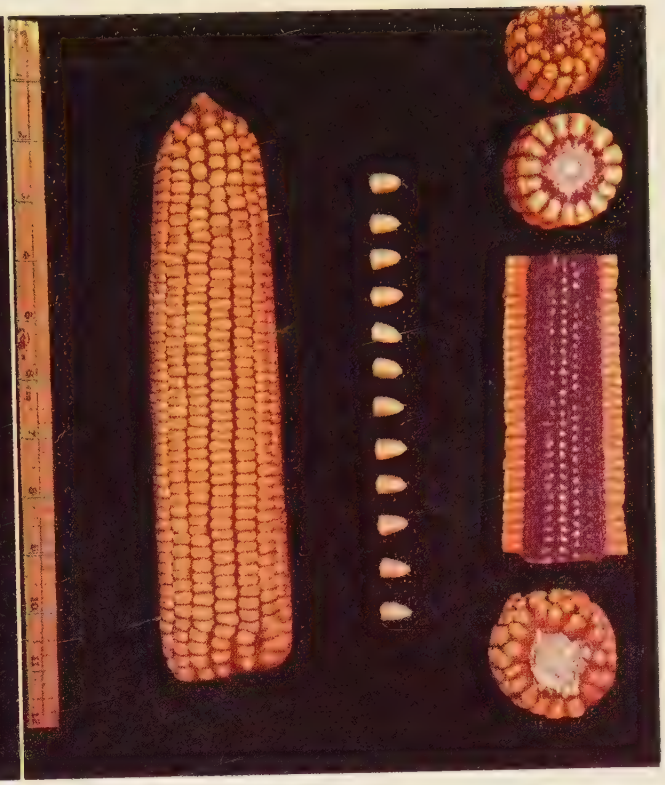

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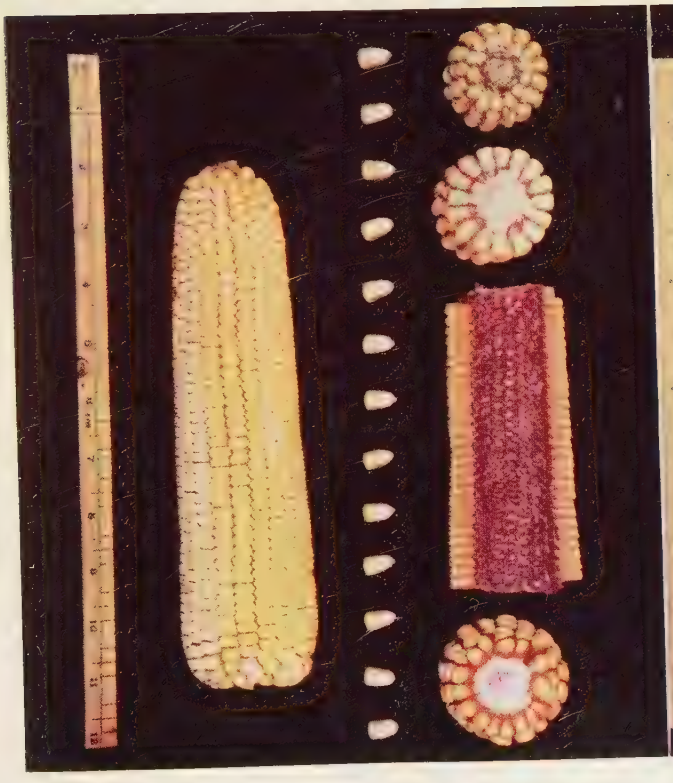

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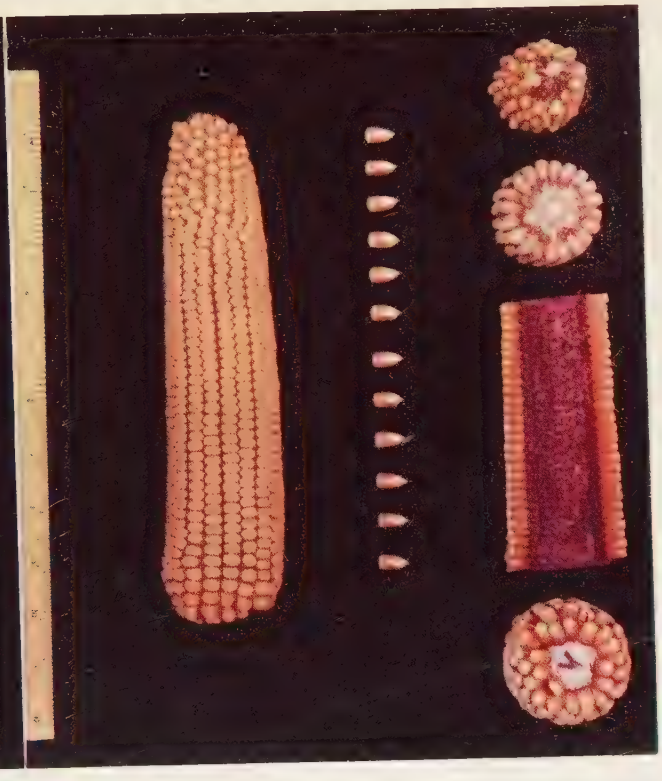

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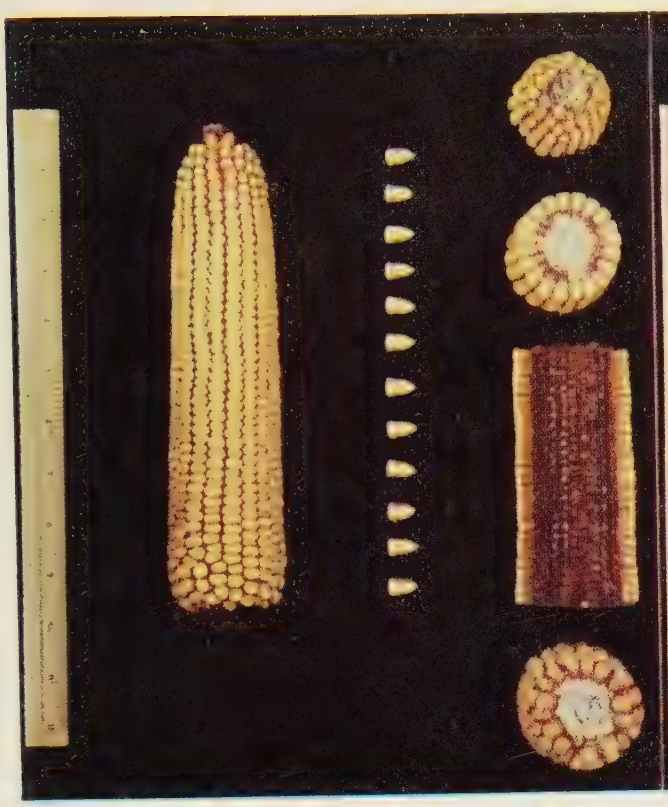

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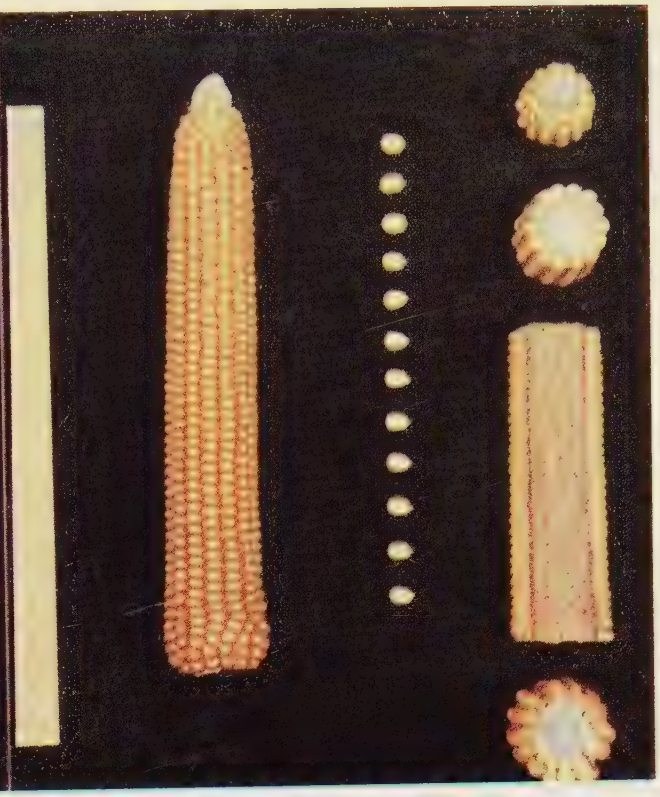
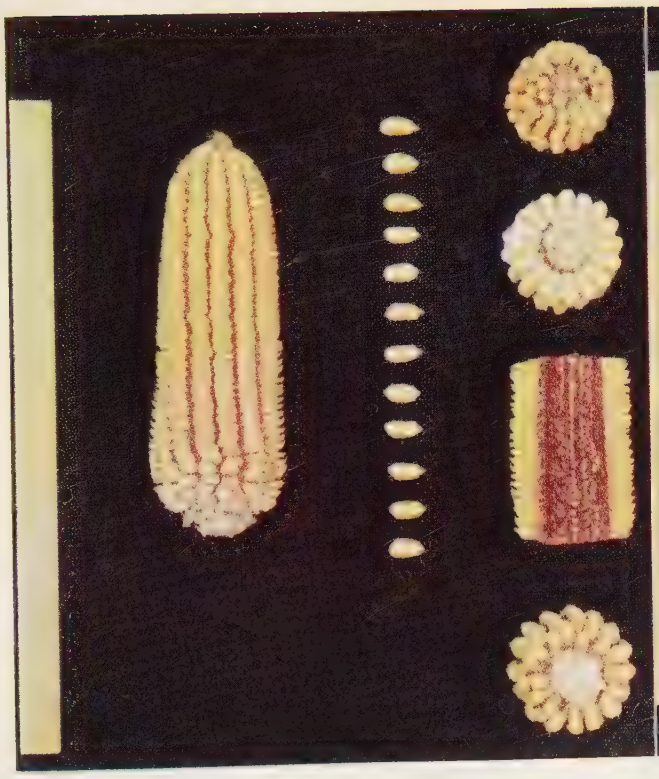
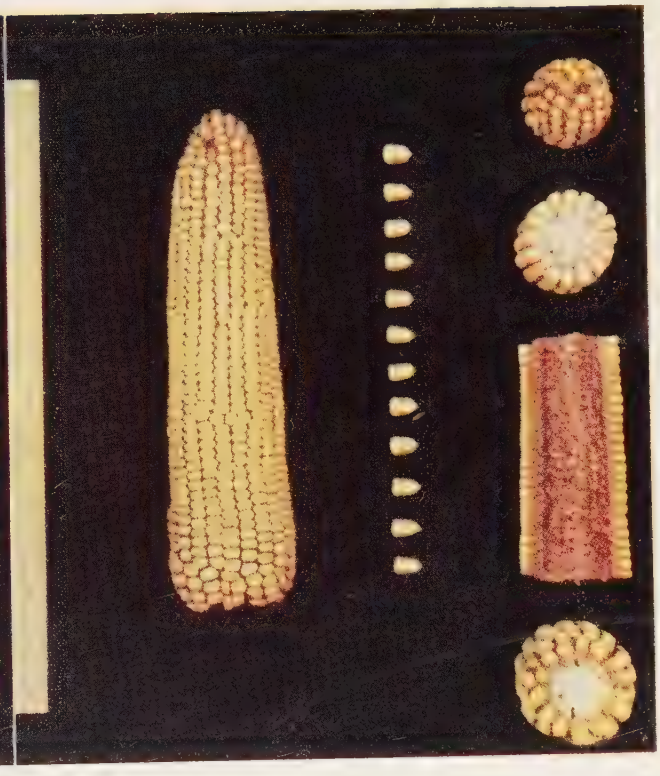


Marigold.



Early Butler.



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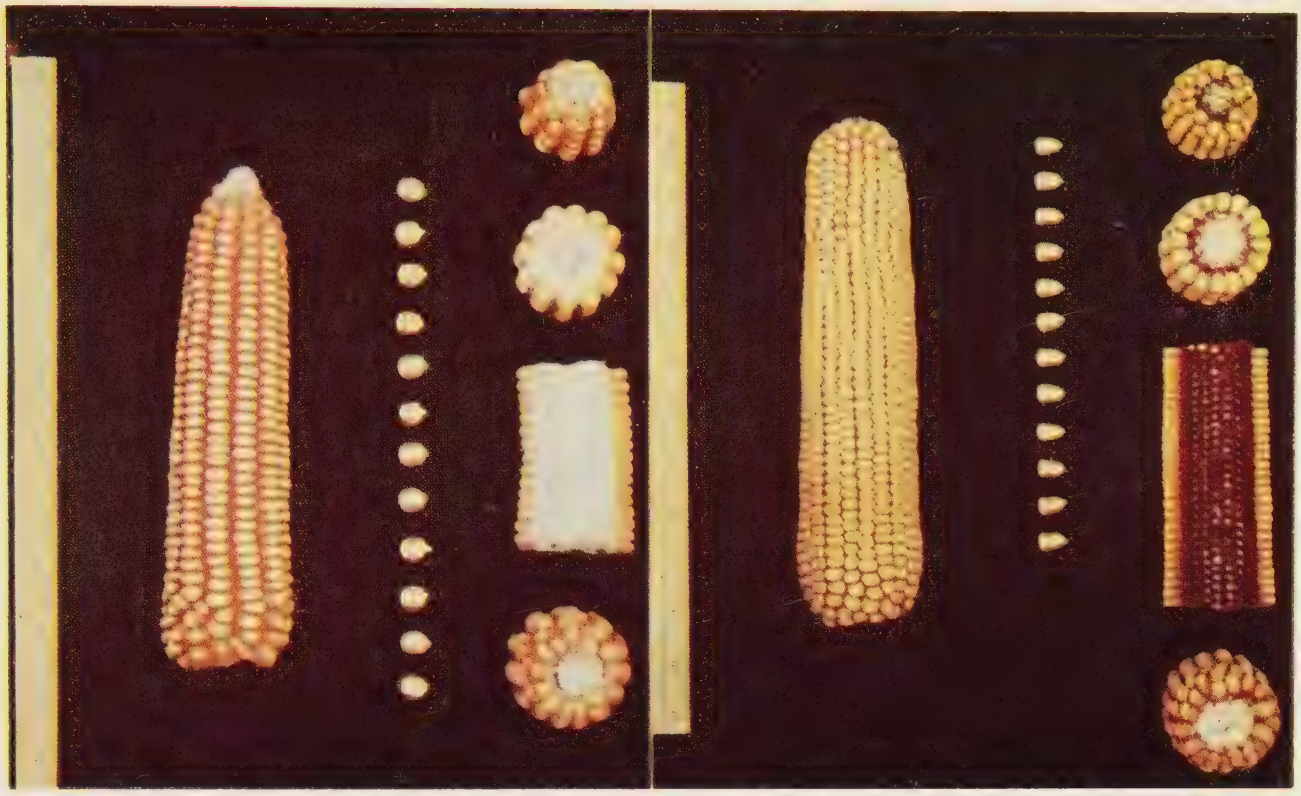
VARIETIES OF MAIZE GROWN IN NEW ZEALAND



Motiti. US13.

The taller the weeds are, the more difficult they become to kill and when maize is well grown the risk of spray damage is greater.

The amine salt of 2,4-D is recommended for spraying. No other formulation has given a more complete kill of weeds at any stage and under all conditions, but some have caused slightly greater damage where a late spray has had to be applied.

Rate of application: No hard-and-fast rule can be given on the amount of spray to use. This is affected by the size of the weeds, growing conditions during the season, and to some extent by the types of weeds. If the season is moist and weed growth rapid, rates as low as ½ lb of acid equivalent per acre will give a good kill, but if the topsoil is dry and weed growth slow, ¾ to 1 lb will be required to kill weeds only 2 to 3 in. tall. The vigour of the weeds, whether caused by the season or the fertility of the soil, is undoubtedly the main factor governing the rate of application.

Probably the most important weeds in the maize growing areas of New Zealand are fathen (*Chenopodium album*), Prince of Wales feather (*Amaranthus retroflexus*), black nightshade (*Solanum nigrum*), and wild turnip (*Sinapis arvensis*). Wild turnip is killed by low rates of spray, black nightshade requires heavier applications, and Prince of Wales feather and fathen require rates between the first two. The rate of spray must be sufficient to kill the most resistant of the weeds present.

The spray recommended for general use is the amine salt of 2,4-D at ¾ lb of acid equivalent per acre in 8 to 12 gallons of water. It should be applied with a conventional boom fitted with 32F tips 14 in. apart travelling at 4 or 5 miles an hour.

Spray Drift Danger

WHEN soil and weather are warm, weedkilling sprays may be caught in warm air currents and drift in even the slightest breeze on to susceptible crops nearby and damage them. To avoid this, spraying in warm weather should be done either before 9 a.m. or late in the evening and low-pressure spraying only should be used to create a droplet size sufficiently large that spray does not become airborne.

Cultivation after Spraying

There is no point in cultivating for the sake of cultivating and the number of strokes should be kept to the minimum necessary to destroy weeds, prevent a "skin" from forming on the soil surface after very heavy rains, and, in dry weather on some soils, to prevent cracks from developing in the soil and drying it out to considerable depths.

The final cultivation should be delayed until the maize is almost too tall and thick for the passage of the implements. It should be designed to throw a light mould of about 6 in. of soil against the bases of the plants. This helps to anchor them against the wind and later assists in the easier lifting by the picker of any fallen stalks. From this stage onward the growth of the maize and the shade of its leaves will hinder weed growth and the crop will need no further attention until harvest unless attacked by insects.

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Good yields depend upon an adequate supply of boron in the soil. Plants suffering from boron deficiency cannot produce sound healthy crops . . . yields will be low! It is essential that any boron deficiency be corrected. High grade **FERTILIZER BORATES** quickly, easily and economically restore boron to the soil . . . give you bigger yields, better crops and bigger profits.

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GUARANTEED 6 MONTHS' USE

Blue Line Universal Moulded Inflations stand any milking test. Dispense with metal rings . . . the seamless, moulded inflation gives perfect mouth assembly. No retensioning needed. These longer-lasting, export quality inflations fit any cup. Give faster, cleaner milking.

For those who prefer it, there's Skellerup's two in one inflation, with both straight and tapered ends—use either.

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Trusting this information will be of interest to you.

J. D. CAIRNS, No. 1 R.D., Te Awamutu.

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Having had such good service from your Universal Inflations which I have been using for the last two years, I thought you should know of my satisfaction with your product.

I have had a full season's use out of each set of Universals and recommend their use to fellow farmers.

W. J. McLEOD, Glenbervie, Whangarei.

Dear Sirs,

For the last four seasons I have been using your Skellerup Moulded Universal Inflations, and have found them to be most satisfactory, giving a full season's service with normal shed conditions.

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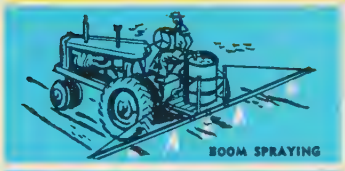

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Hypro Pumps are most suitable and economical for the new sheep sprayers. They provide ample pressure and volume for either Tractor or independent engine drive. For livestock spraying they have the pressure to drive the spray material through the hair or wool and thoroughly cover the hide.

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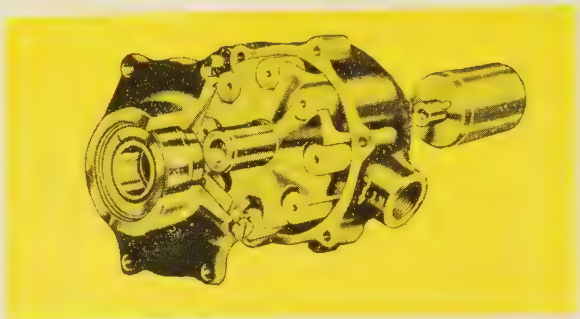

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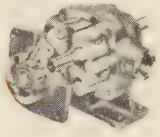
High pressure nylon roller pump operates at 350 lbs. P.S.I. either from power take off or independent petrol engine. Little maintenance required.

N6000.
Nylon roller pump operates at pressures up to 200 lbs. P.S.I. High and low pressures for gorse or pasture spraying. Operates from power take off or independent petrol engine.



N1500.
This extremely versatile pump can handle liquids and semi-liquids and is available for countless uses in industry and agriculture.

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Revolutionary irrigation pump used from the power take off. 2in. pump (roller type), self priming, pumps water in high volume at pressures up to 40 lbs. P.S.I.

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A really capable general purpose pump in high grade cast bronze. Working pressures of up to 75 lbs.

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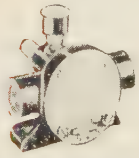
General purpose pump. Pumps liquids up to pressures of 30 lbs. P.S.I. Just right for home or Industrial use.



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Growing Interest in Bulk Handling of Grain

CONSIDERABLE scope for modifications in bulk handling of grain to suit particular farm or transport conditions was thoroughly demonstrated to farmers at a working display of bulk grain equipment at Addington Showgrounds, Christchurch, at the Third Bulk Grain Conference on 15 June. An attendance of over 1,000, including farmers from many parts of the South Island and from Manawatu, Wairarapa, and Hawke's Bay, exceeded all expectations and showed the extent to which interest in this method of harvesting has grown.

Header delivering grain into a plywood V hopper mounted on a flat-top truck.

C. J. CROSBIE, Farm Advisory Officer (Machinery), Department of Agriculture, Christchurch, who described features of the machines and methods of operating*, suggested that a good deal of equipment could be improvised from machinery to be found on most farms where grain was grown. Despite the fact that well over 100 bulk headers would be operating in 1962, this would be only 3 per cent of all the headers working, said Mr Crosbie. Farmers were cautioned by Mr L. C. Dunshea, General Manager of the Wheat Committee, about too rapid change-over to bulk methods. He referred to a warning given in a 1953 report on bulk handling that ". . . very great difficulties . . . could be encountered if many farmers turned to bulk handling without suitable means of storing wheat on the farm, and before transport and millers' facilities are sufficiently adjusted to meet the new problems involved". "I consider that advice still holds", said Mr Dunshea.

Storage on Farms

Up to the present, said Mr Dunshea, few farmers had handled wheat in bulk; most of them had been able to arrange prompt dispatch and storage at mills. However, with more farmers bulk handling in future, provision would have to be made for farm storage. Farmers must be prepared to hold wheat for delivery as the market could absorb it.

An open type of implement shed would do for storing wheat on a concrete floor and preferably with a suitable moisture barrier for say three weeks, but if there was substantial development of bulk handling, more permanent storage facilities would be needed. This could be plywood or similar bins in existing farm buildings or double-skinned sheds, or, where shed space could not be spared, corrugated steel bins.

The present position suggested that foreseeable expansion in bulk handling over the next two seasons could be coped with. However, during that time all those affected would need to watch developments closely so that all had a proper appreciation of the problems and safeguards.

Moisture Content

Though no great difficulty was experienced in Canterbury last season in satisfactorily field ripening wheat during the worst harvesting weather for 20 years, prospective bulk handlers were warned to bin wheat with a moisture content of not more than 15 per cent. A complication in moisture testing from what he termed "flash drying" was mentioned by Mr Crosbie. Last season in Canterbury had been characterised by very wet and very dry periods. Owing to hot, dry north-west winds crops gave moisture readings sufficiently low for bulk storage, but individual grains were very dry on the outside but damper in the centre. Probe moisture meters and those using whole grains for quick readings gave moisture levels up to 2 per cent lower than true levels.

Testers that worked on a ground sample gave the true reading because they registered on a blend of the particles throughout the grain. Because of the likelihood of the re-occurrence of the harvesting weather mentioned growers would in future be wise to buy ground-sample testers.

Grain Drying

L. H. Weston, Farm Advisory Officer (Machinery), Department of Agriculture, Dunedin, told the conference that two mills and about 25 farmers in Otago and Southland now had grain dryers. Use of them removed worry

* Described in his article "Bulk Grain Harvesting" in the February issue.

Kill problem grasses with **DOWPON**

FULLY TESTED AND PROVED BY NEW ZEALAND FARMERS

For the farmer who has a grass problem, Dowpon* grass killer provides a safe, sure and inexpensive solution. Dowpon *systemic* herbicide does not have to soak through the soil to reach the roots. When Dowpon is sprayed on the leaves, the active ingredient, Dalapon*, penetrates the plant's growing system deep down into the roots, killing the whole plant. Dowpon is ideal for killing grass weeds with travelling roots such as Couch, Paspalum and Kikuyu, because it is *more* effective, yet *less* expensive than repeated cutting or hoeing.

PASTURE RENEWAL

Spray Dowpon on old, worn-out pastures . . . also hilly areas difficult to reach with machines. Dowpon controls moisture — and nourishment-robbing nuisance grasses . . . permits re-seeding of high-producing legumes and grasses.

SELECTIVE WEED CONTROL

Spray Dowpon on grass weeds in orchards, applying when grass has good foliage and is growing vigorously, but before seed stalks appear. A second spot treatment later easily catches sprouts missed the first time.

NON-CROP GRASS CONTROL

Use Dowpon to control grasses in headlands, along fence lines . . . and to prevent grass from spreading onto your croplands. And because Dowpon acts systemically, and need only be sprayed on the foliage, you can kill raupo and grasses clogging irrigation and drainage ditches even when they are standing in water.

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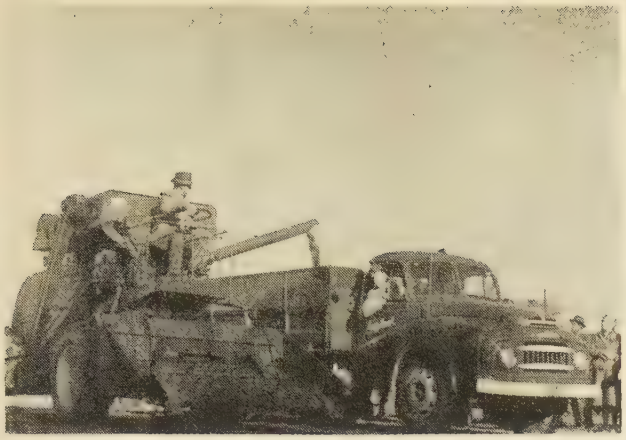


Left above—Self-propelled header unloading into farmer's 6-ton tip truck.

Right above—Same truck tipping on to a twin 6 in. auger delivering grain at about a ton a minute into a field bin.

One-man Bulk Grain Harvesting

UNDOUBTEDLY the highlight of last harvest was the development of one-man bulk grain harvesting. This is of particular importance on the smaller one-man farms which employ no labour. On such farms in the last two seasons it has been extremely difficult to obtain outside labour in the harvest period to assist on the header. One-man bulk grain harvesting has made reliance on such labour unnecessary. The farmer alone is able to harvest his grain each suitable day, and each night he has the satisfaction of knowing that what he has harvested is safely under cover in the bulk bin or at the mill. Generally, he harvests faster than he did previously with a bagging header.

By C. J. CROSBIE

Briefly, the system consists of discharging the bulk grain either direct from the header or via an auger into a field bin. A 13- or 20-ton plywood bin is built over a round wooden floor on a sledge base and the bin is covered at night with a tarpaulin. The grain can be stored in these field bins until after harvest or carted away during harvest by a transport firm. Because of the "buffer" capacity of the field bins, the transport company is not tied to a rigid timetable, and there is a valuable degree of flexibility for both farmer and carrying firm.

This is how six one-man Canterbury farms handled grain in bulk last season:

1 The farmer bulk harvested wheat into his farm tip trailer and when this was full he stopped the header and with his second tractor took the trailer to the farm yard, where the grain was augered into a 20-ton plywood bin on a raised floor.

2 A farmer-contractor bulk headed a large area of wheat and barley into a 10-ton steel field bin on a 4-wheeled trailer chassis with its own petrol-motor-powered 9 in. unloading auger. He was responsible for keeping it full and transport firms for emptying it and carting the produce away.

3 A farmer with a medium bulk header discharged into a 13-ton field bin on a sledge and as required the transport firm with its own petrol-powered mobile 6 in. auger loaded out the grain and took it to the mill. Starting from empty and harvesting 5 tons per hour, the farmer had 2½ hours' heading before unloading of the bin became necessary.

4 A farmer built two 13-ton field bins and augered direct into them the grain from one 20-acre field. When this had been carted to the mill by a transport firm the empty bins were towed into another field and harvesting began again.

5 On a mixed farm which includes a poultry unit the farmer needed a new granary. Because of building costs, increasing sack costs, and rat damage he constructed a round galvanised bulk silo on a concrete base and augered grain from an adjacent field direct from his bulk header into this silo.

6 The owner of a one-man farm built a ton hopper on his header and two 20-ton field bins on sledges and put one in each of two 17 acre wheat fields. After harvesting for 15 to 20 minutes he emptied the hopper by gravity on to a 6 in. auger, with which the grain was elevated into a field bin in about five minutes; the auger was also used for loading out. This farmer increased his harvesting rate by at least 50 per cent with half the labour previously needed.

about the moisture content of bulk grain; a grower with a dryer could start harvesting earlier and thus get in his grain in better condition and with fewer delays. Such grain could be sold more readily.

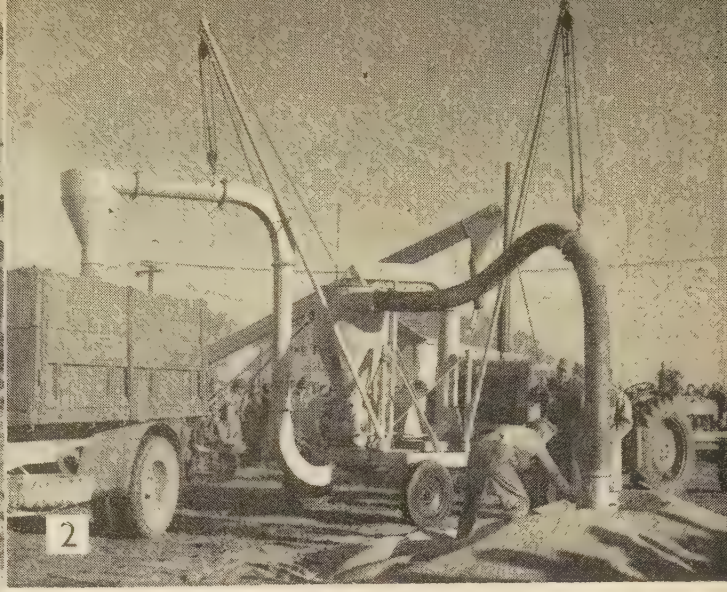
A dryer was a good insurance against losses in a bad harvesting season, but if it was installed purely as an "insurance", its cost must be justified by the estimated losses prevented. The equipment was undoubtedly economic if it was used every year for part or all of a farmer's crop (allowing earlier harvesting and ensuring a top-quality product) and possibly to dry additional grain on contract.

Running costs were unlikely to exceed 6d. per bushel, which was 6d less than the contract price for drying. The following were suggested as profitable capital investments in wheat-drying facilities:

Crop bushels	Suggested capital investment £
1,500	250
3,000	500
4,500	750
6,000	1,000
7,500	1,250
9,000	1,500
10,500	1,750
12,000	2,000

Pre-harvest Organisation

Bulk handling involved some pre-harvest organisation, H. R. Evans, Farm Advisory Officer (Economics), Department of Agriculture, Ashburton, warned farmers. Silos of the type that was dismantled had to be assembled and this took an hour per silo. If grain was to be taken to the rail, railway trucks would have to be ordered and be somewhere in the yards where they did not interfere



1—Some transport firms already own mobile self-powered augers for loading bulk grain on to their trucks from heaps in fields or sheds or from bins.

2—The Canterbury (N.Z.) Malting Company's portable suction unloading plant demonstrates its versatility by lifting bulk wheat from the ground into a tip truck at about 30 tons per hour.

3—A short length of truck-tyre tube attached to the unloading slide of this 6-ton tip truck controls the flow of grain into the 6 in. auger used for lifting grain into railway wagons. This automatic volume control enables the farmer who operates these units to leave them to continue loading while he cleans out further railway wagons preparatory to filling or he covers filled ones.

with normal railway operations yet where they could be loaded from lorries carting from the farm.

Because of possible difficulties with railway trucks it was desirable to have some storage on the farm even when the intention was to deliver grain to the rail immediately. A storage "buffer" enabled harvesting to proceed whenever the weather permitted and grain to be carted to the rail when wagons were available.

Where silos were available on the farm bulk grain could be stored at little cost, and storage increments were a useful means of paying for silos. A satisfactory system of orderly deliveries of bulk grain from farms could solve many of the present transport and storage problems, Mr Evans believed. It would reduce the need for large and costly storage at mills, ease the rush on transport firms at harvest time, and save the farmer worrying about whether the carrier or the rain would get to the farm first.

Cost of Extra Equipment

If one added the various costs of extra equipment needed to change to bulk handling, it was not difficult to get a substantial total, but farmers could usually adapt a good deal of equipment they already had at very little cost. Mr Evans suggested that farmers who were considering changing over to bulk handling should "have a look round the yard and see what bulk handling equipment is already there disguised as something else".

Photographs by Mannering and Donaldson.

How to Avoid Pests of Stored Grain

IN dealing with pests of stored grain, **prevention** is easier and **cheaper** than cure, A. D. Lowe, Entomology Division, Department of Scientific and Industrial Research, Lincoln, told farmers at the bulk grain handling conference. He made these recommendations:

Grain must be dry: Moist grain is more attractive to pests and subject to mould. All grain stored should have a moisture content of 15 per cent or less.

Storage materials must be insect proof: For silos use concrete, metal (such as galvanised iron), good sound timber (including resin-bonded plywood), polythene, or hessian (preferably new, but otherwise treated annually by immersing in hot water for 10 minutes). Contamination must be avoided by: (a) Emptying the header and silo before harvesting is begun. (b) Spraying or fumigating the silo. (c) Avoiding contact between grain and hay or second-hand sacks. (d) Thoroughly cleaning and treating any sheds used for storage.

Silos must be waterproof and, if possible, gas proof: Dampness can cause serious loss in grain. As a 10 ft silo holds £500 worth, simple construction precautions are only common sense. If the storage space is properly constructed clear of the ground, the exterior is painted, and a waterproof roof is provided, grain should easily retain its quality for a year. If the silo is made gas proof, it can be fumigated easily should grain become infested. Fumigation by firms which specialise in this work is recommended.

CLEAN, WATERPROOF STORAGE OF DRY GRAIN WILL KEEP YOU OUT OF TROUBLE.

ROUND THE RESEARCH STATIONS

Current Work and Findings in Department of Agriculture Trials and Experiments

Ruakura

Testing Toxicity of Facial Eczema Spores on Pasture

A large number of research centres are working in collaboration on specialised aspects of facial eczema, with encouraging results in many cases, but the best method of protection at present is to remove the animals during dangerous periods from the fungal spores producing the liver-damaging toxin.

This necessitates the development of a warning system for the danger periods. The evolution of such a system again involves the integration of the work of a number of different scientists in different fields and at different centres.

To assess the spore population of a particular paddock or area of pasture a spore trap has been devised which could be described as a cross between a carpet beater and a vacuum cleaner. When pushed over a paddock the machine displaces the spores from the grass, then sucks them up and deposits them on a treated glass slide where they can be counted under a microscope.

Though extremely useful in giving an indication of the spore levels, the spore trap has a major weakness in that it does not give any measure of the actual toxicity of the spores collected. This variation in the toxin-producing ability of the spores of different isolates of the fungus could possibly account for a number of anomalies. One of these is the fact that the incidence of facial eczema is reasonably related to spore counts in some cases but not in others.

The demonstration that sulphur is a constituent of the toxin has led to a chemical test for determining the amount of toxin present in material of fungal origin. Unfortunately this test cannot be readily applied to samples of pasture, because pasture contains many constituents which interfere with the test. Recent work promises to overcome this disadvantage. With a domestic vacuum cleaner in which a series of filters is incorporated quite large numbers of comparatively pure spores can be collected directly from pasture. These can then be chemically assayed for facial eczema toxin.

The mobile spore trap used at Ruakura.

It is hoped that this and other methods used in conjunction with the spore trap will eventually increase the accuracy of forecasting methods.

Levin

"Pink Eye" of Pears

A disease locally called "pink eye" or "pink butt" has been affecting fruit of the 'William's Bon Chretien' pear for a number of years and has shown up to a varying extent in the Auckland, Nelson, Hawke's Bay, and Central Otago districts. In the 1961 harvesting season the disease caused extensive loss of fruit of Bon Chretien in Hawke's Bay. Exports had to be reduced and canning programmes were upset due to the amount of rotting in fruit held for canning.

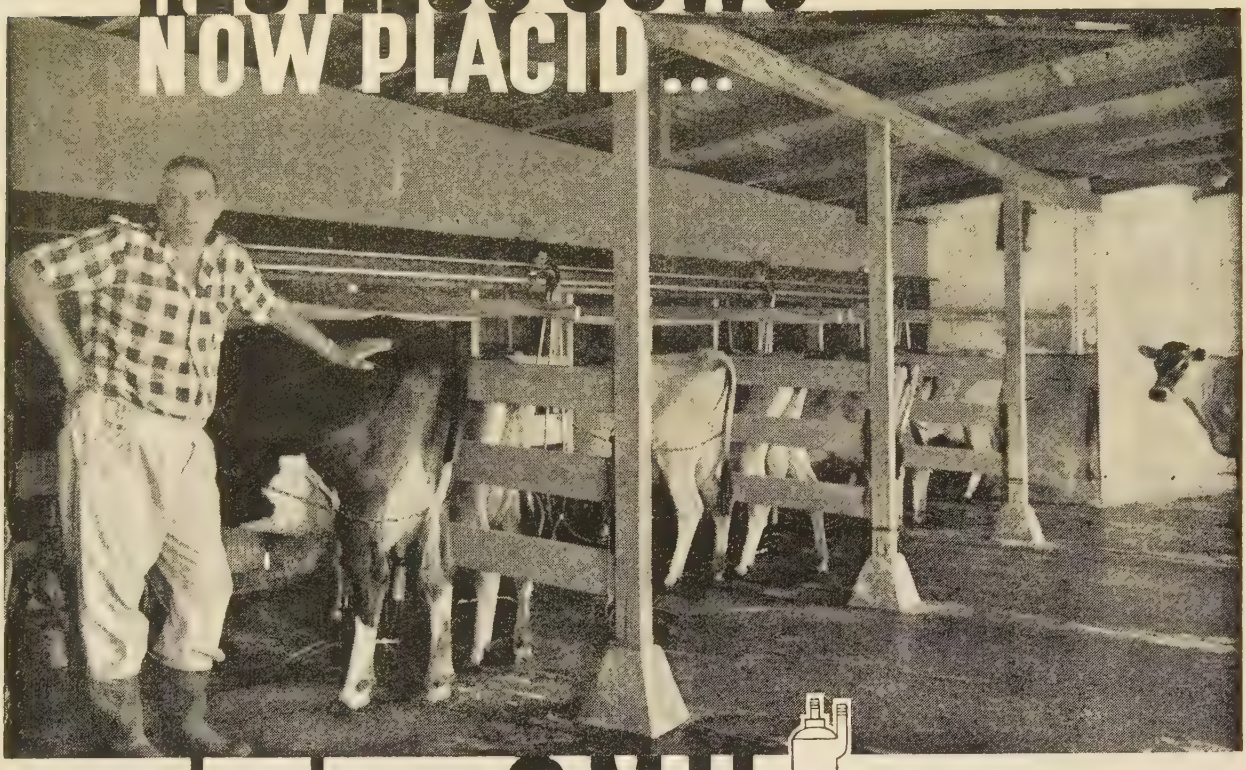
Symptoms of the disease include pink discolouration of the skin round the calyx of the fruit followed by rotting of the fruit. Cold storage delays the decay, but this rapidly increases when the fruit is removed from storage.

Field observations indicate that the disease is not a physiological disturbance and no significant relation between conditions of environment and outbreaks or spread of the disorder can be found; neither does spread of the disease suggest a virus as the cause.

Details of investigations and research into the disease by Dr G. W. F. Maris McArthur during the past two years will be published elsewhere. Work to date indicates that the disorder is caused by either a bacterium or a fungus.

Research is continuing to discover the causal organism and to find a suitable control programme.

RESTLESS COWS NOW PLACID...



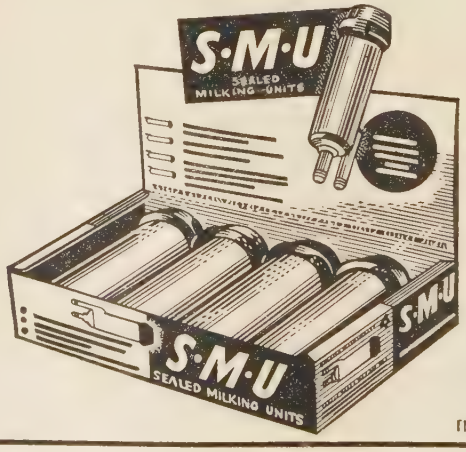
...thanks to S·M·U·

Says Mr. R. A. (Andy) McFarlane, No. 4 R.D. Kereone, Morrinsville

(11:4:61)

Here's what Mr. McFarlane says:
"Before fitting the 'S.M.U. Sealed Milking Units to my plant I used to have a lot of trouble with restless cows and the breaking-in of heifers. This is a complaint with which all farmers are familiar I am sure. HOWEVER, THIS SEASON I CAN HONESTLY STATE THAT THANKS TO THE 'S.M.U.' THOSE FORMERLY RESTLESS COWS AND HEIFERS ARE NOW PLACID. I put this down to the complete absence of drag on the udder when milking with the 'S.M.U.' Sealed Milking Unit I used to apply the leg rope to start with but after a short while on 'S.M.U. this becomes unnecessary. Not only that but quarter trouble is practically eliminated in my herd and my butterfat production is up 5,000 lbs. to a record total of 32,500 lbs. . . . And with the season still unfinished! I would recommend the S.M.U.' Sealed Milking Units to anyone. No farm is up to date without them."

Like Mr. McFarlane, thousands of farmers all over New Zealand and Australia have found that the "S.M.U." Sealed Milking Unit not only eliminates quarter trouble but increases butterfat production, makes formerly restless cows placid and is ideal for breaking in heifers, to name just a few of the advantages. Get your farm up to date, ready for a profitable and trouble-free season by installing "S.M.U." throughout your shed today.



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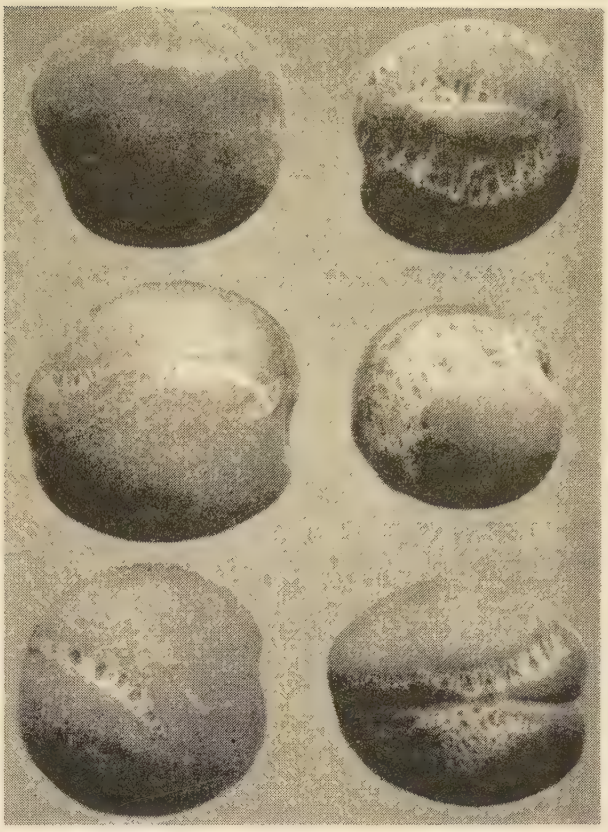
Spring Frosts in the Home Orchard

By S. FREW,
Instructor in Horticulture, Department of Agriculture, Christchurch

LATE spring frosts in many parts of New Zealand are a regular threat to fruit crops in both commercial orchards and home gardens. Commercial orchardists must take precautions to fight frost where losses are likely to be serious, but the home orchardist generally does little to prevent frost damage, though measures can sometimes be taken to alleviate the danger with little cost or effort. Methods of limited protection are outlined in this article, which also describes routine spring work in the home orchard.



The heavy russet marks and malformation of these apricots are the result of frost damage not severe enough to destroy the crop completely.

TRUE frost occurs if the ground temperature falls below 32 degrees on a still night or when only a gentle breeze is blowing. A frost may be the common white or hoar frost or the more unusual black frost, according to the amount of moisture in the ground or in the atmosphere. A black frost occurs when the air and soil are particularly dry and no visible rime is present, though temperatures drop below 32 degrees.

When there is a wind of considerable strength blowing from the south or off snow-covered mountains, the temperature of the whole body of air may drop to a damaging level. This is called a "freeze". This condition fortunately occurs only rarely in New Zealand, and usually is confined to Central Otago. It cannot strictly be included in the category of a frost, though it is most damaging to plant life and is impossible to combat.

How and Why Frosts Occur

Frosts are caused through loss of heat from the ground, mainly by radiation. This radiation of heat is continuous both day and night, but during the day the amount of heat received from the sun is usually much greater than that lost by radiation from the earth. After the sun sets, however, no heat is received from it to counterbalance the loss by outgoing radiation and the temperature of the ground and that of the air above it falls. This net loss of heat by radiation is reduced when the atmosphere is moisture laden and capable of absorbing and reflecting some of these heat rays. Hence the more moisture there is in the atmosphere, the less the risk of frost. A cloudy sky at night acts as a blanket to the earth's surface. The higher the cloud is, the less protection it provides.

Foliage injury, die back, and defoliation of cherry twigs caused by frost damage.

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means better silage with practically no waste

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SILOTHENE covers are easily kept in position. Simply use the toe of the stack, old hay or sawdust to a depth of 6 inches.

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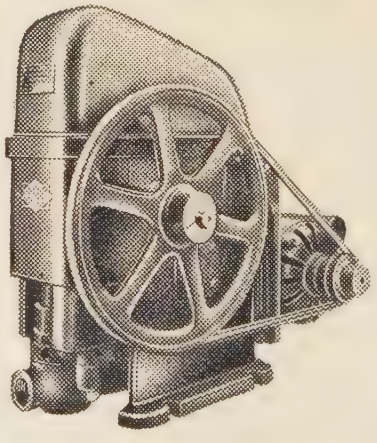

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A dense shelter belt creates a frost pocket and the lower fruit trees could be damaged by frost. The removal of a tree in the shelter belt provides an outlet for the cold air, enabling it to continue draining downhill, and preventing the formation of a frost level dangerous to fruit trees.

On a clear night, however, there is nothing to reduce the loss of heat by radiation from the earth's surface and cooling is rapid and continuous. Since this outward radiation travels in all directions, the greatest loss of heat is suffered by horizontal surfaces fully exposed to the sky. For instance, the top of a wall emits radiation through the full 180 degrees, whereas the sides can radiate only through about 90 degrees and will **receive** some of the heat radiated from the ground. (This is the explanation of the frequently observed condition when the top of a wall may be frosted and the sides are not.)

Radiation from surfaces not fully exposed to the sky is interrupted and cooling is slower. Thus an open-ended glass cloche, though allowing free circulation of air, remains warmer than the outside air, because the glass reflects some of the heat radiating upward. Overhanging branches of a large spreading tree protect the ground below for the same reason, and the eaves of a house add to the partial protection afforded by the wall itself.

Effect of Moisture in the Soil

The loss of heat from the soil is accelerated or retarded according to the moisture content of the soil. Moisture releases latent heat in cooling. Moist areas cool slower than dry areas. Temperature fall in a soil with a moisture content of 20 per cent may be only a fifth that in a comparable perfectly dry soil.

Effect of Convection

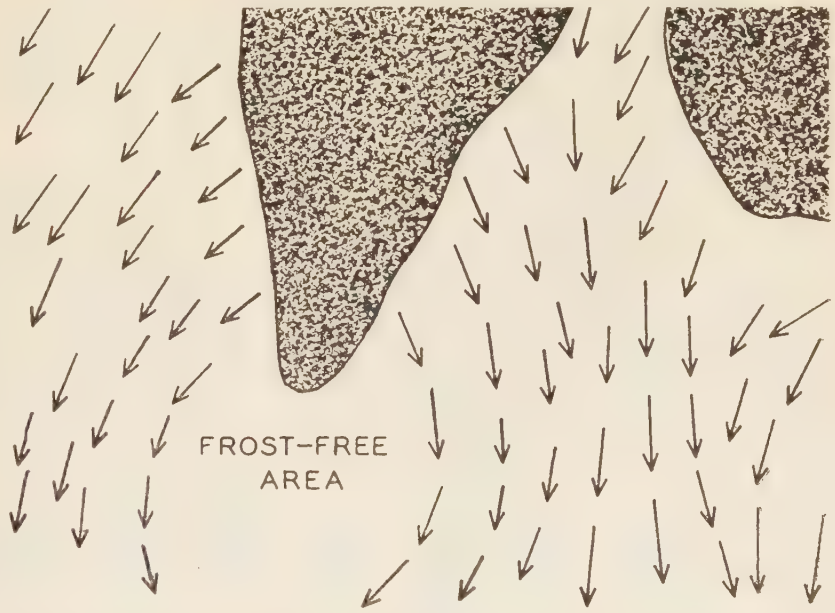
Convection, or the upward movement of air, occurs when a layer of air becomes warmer and hence lighter than the layer above it. During the day the thin layer of air warmed by the ground becomes appreciably warmer than the air immediately above it, and is therefore forced upward and replaced by the cooler, denser air above, which falls to the lower levels. The air now in contact with the ground is in its turn warmed and the process is repeated. The heated air continues to be forced upward until it reaches a point of equilibrium, and in this way the ground's heat is imparted to a layer of air of considerable depth. At night, on the other hand, the air in contact with the ground is cooled first, and will not rise. The coldest temperatures are close to the ground and the temperature normally increases up to a height of about 25 to 50 ft. If the top of this relatively shallow layer is above freezing point, orchard heating of the lower layer is practicable.

Effect of Turbulence

Air turbulence, or wind, thoroughly mixes these layers of cold and warmer air and therefore prevents a damaging cold layer from remaining near the ground. Frost thus does not occur on a windy night. The springing up of a wind on a clear, cold night can raise the temperature 5 to 10 degrees in a short time.

Effect of Air Drainage

Air drainage is the term used to express the downward flow of cold air in hill and valley regions. Though the implication that cold air flows like water down a hillside is not strictly correct, the movement can be likened to a sluggish flow of that general pattern, particularly when the cold stream of air reaches the valley floor



Cold air flows from hillsides down valleys and fans out over flats. Land at the base of a spur is not so subject to this cold air flow and often becomes a frost free pocket.

Bacteriologist on the sheep farm

Into every tube of Vetspen Hypodermic penicillin injection, kept ready-to-hand by wise sheep-farmers during lambing, goes all the skill and painstaking care of this young bacteriologist. As one of the large team of Glaxo scientists, her particular work is to help maintain ceaseless vigilance against bacterial contamination. She assists in the company's never-ending search for new substances to eradicate disease-causing bacteria. Her work ensures that each tube of Vetspen Hypodermic is fully potent and ready to help the sheep-farmer combat diseases, such as blood poisoning, that can cause heavy losses at lambing time.

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and gravitates toward any depressions. Obstacles in the path of this flow, such as walls or perpendicular wind breaks, will cause the air to bank up behind them so that the depth of air at a damaging temperature will be increased at these points.

Effect of Ground Vegetation

Exposed plant surfaces lose their heat at ground level somewhat faster than does the earth's surface, but the difference is not great. An area of bare ground may be ½ degree higher in temperature than a similar area in lawn, but the temperature in grass 6 in. high may still be near that of ground level; consequently the layer of cold air is deeper in long grass and brings taller plant life nearer to the damaging zone.

How Much Frost Can Fruits Stand?

The intensity and duration of a frost affect the extent of damage. Most fruits can stand several degrees of spring frost for a short time, but if the low temperature lasts more than 30 minutes, allowing the cold to penetrate to the inner part of the bud, flower, or fruitlet, damage may result. The following table, of American origin, has proved fairly reliable under New Zealand conditions and is a good guide for most types of deciduous fruits:

DAMAGE BY FROST

(Temperatures endured for 30 minutes or less by deciduous fruits)

Kind of fruit	Stage of development: Buds showing colour	Full bloom	Small green fruits
	degrees F	degrees F	degrees F
Apples	25	28	29
Peaches	25	27	30
Cherries	28	28	30
Pears	25	28	30
Plums	25	28	30
Apricots	24	28	31
Grapes	30	31	31
Walnuts	30	30	30

Means of Frost Protection

With all the above factors taken into consideration, what measures can be taken to avoid frost damage?

Selection of Frost-free Site

Because air turbulence and moisture reduce the frost hazard, land alongside a large body of water is less prone to frost, as the air will always contain more moisture than in other parts. Land alongside a swiftly flowing river has the same advantage as well as a tendency to be influenced by the air draught turbulence associated with running water, and is therefore still less subject to frost.

As air drainage results in the gravitation of the cold air to lower levels, the foot of a gully, or the flat area near the approach to a valley, will be more susceptible than the flat area adjacent to a spur. Cold air flowing down a valley will fan out over the flat. Cold air from a spur will flow each side of adjoining land and provide some protection for it. Where choice of site is practicable these danger spots can be avoided and the more favourable ones selected.

Facilitate Air Drainage

A dense shelter belt on the lower side of a sloping section will prevent drainage of cold air from the property, and a frost "pocket" is built up. If gaps are made in this dense shelter to facilitate air drainage, and if there is lower land beyond, the area will become less susceptible. The removal of odd trees at the lowest points in the shelter belt should successfully achieve this.

Protection by Cover

Fruit trees grown on the espalier system against a wall, especially a house wall with an overhanging eave, will receive some protection.

Young trees may be protected by erecting a scrim cover above them to reduce heat loss by radiation. As the trees grow higher, so the frost danger recedes, and protection for a young tree therefore may often be necessary only during the first year or two of its growth.

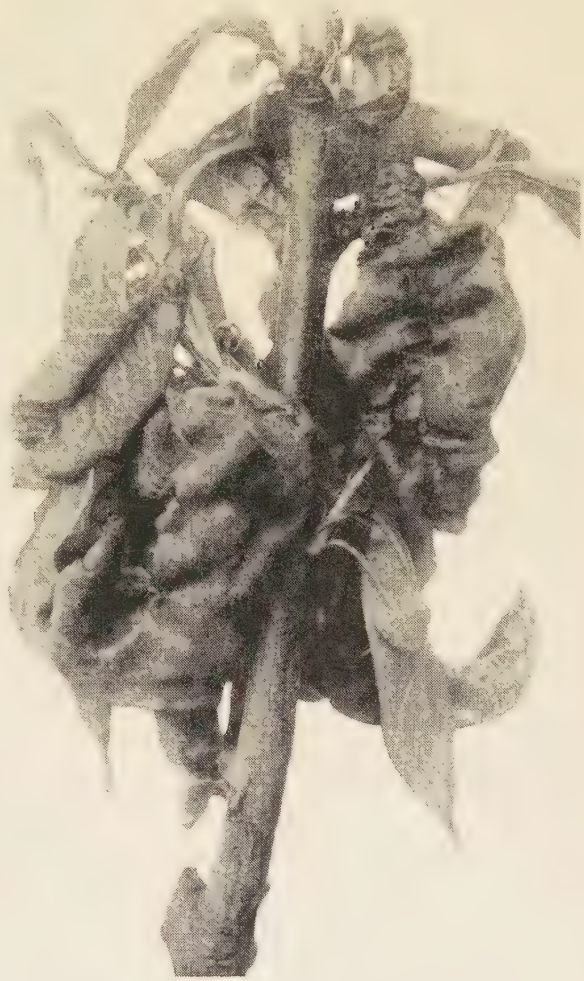
The Role of Moisture

Frosts may be checked by flooding the soil near trees early enough for the water to warm up during the day. The latent heat released from this water at night will retard the drop in temperature considerably, and unless the frost is prolonged, worthwhile protection can be afforded. If there is a succession of frosty nights, with not enough warmth during the day to melt any ice formed from this water, the ground temperatures will become lower than ever, and no protection will be accorded in the ensuing night. Provided the ice melts during the day, thus absorbing further latent heat, the flooded area will remain reasonably frost resistant.

Susceptible plant parts may be protected by a very fine spray of water. **This may be the home orchardist's most practical way of reducing frost damage. An overhead sprinkler adjusted to produce a very fine spray (at the rate of 1/10 in. per hour) over plants or trees for the duration of the frost, and maintained until any ice formed on the tree has melted again, will give worth-while protection.** One disadvantage during an excessively frosty period is the possibility of excess water remaining on the ground and penetrating to the root zone causing damage to roots. Good drainage, therefore, is imperative if this form of frost protection is used over a long period.

Mowing of Grass, or Clean Cultivation

As tall grass or weed growth results in a deeper layer of cold air near the



For control of leaf curl copper oxychloride must be applied at bud movement.

SPRING WORK IN HOME ORCHARD . . .

BERRY FRUIT SPRAY PROGRAMMES

1. For raspberries, boysenberries, and loganberries:

Time of application	Material	Quantity for 4 gals. water	For control of
Green tip stage ..	Copper oxychloride ..	3½ oz	Leaf spot, cane wilt
Pre-blossom	Copper oxychloride plus lead arsenate	3½ oz	Leaf spot, cane wilt, leaf roller, bud moth
When aphids appear	Malathion ..	¾ oz	Aphids
After harvest ..	Copper oxychloride .. plus lead arsenate ..	3½ oz 1 oz	Clean-up spray

2. For currants and gooseberries:

Time of application	Material	Quantity for 4 gals. water	For control of
Bud movement ..	Copper oxychloride ..	3½ oz	Fungous diseases
Pre-blossom	Copper oxychloride .. plus lead arsenate ..	3½ oz 1 oz	Leaf spot, caterpillars
When aphids appear	Malathion ..	¾ oz	Aphids

3. For strawberries:

Time of application	Material	Quantity for 4 gals. water	For control of
Late August early September	Copper oxychloride .. plus summer oil	3 oz .6 fl. oz.	Fungous diseases, red mite
Before first flowering	Thiram 50 per cent plus malathion ..	2 oz ¾ oz	Botrytis rot, aphids, mites, leaf hopper
At 10-day intervals until one week before harvesting ..	Repeat		

APPLE AND PEAR SPRAY PROGRAMME

Time of application	Material	Quantity for 4 gals. water	For control of
Buds showing green tip	Lime sulphur ..	1 pint	Black spot Powdery mildew
Petal fall	Colloidal sulphur (40 per cent) plus lead arsenate ..	2 oz 1 oz	Black spot Powdery mildew Codling moth Leaf roller Pear slug
Subsequently, every three weeks until one month from harvesting	Repeat petal fall spray		
When sucking insects appear	Add malathion ¾ oz to above spray		Woolly aphid Leaf hopper Mites

STONE FRUIT SPRAY PROGRAMME

Time of application	Material	Quantity for 4 gals. water	For control of
At first swelling of buds	*Copper oxychloride ..	3½ oz	Leaf curl Bladder plum
10 days later ..	Repeat		
Late petal fall (usually when aphids first appear) ..	Malathion ..	¾ oz	Shot-hole Peach aphid (leaves become curled)
Three weeks before harvest	Captan ..	1 oz	Brown rot
Extra sprays:			
If leaves become infected with rust ..	Captan ..	1 oz	Leaf rust
If leaf-roller caterpillar appears	Add DDD to captan ..	1 oz	Leaf roller

* A substitute for Bordeaux mixture. Those who prefer to use Bordeaux mixture should apply it at 6 oz of copper sulphate and 5 oz of hydrated lime to 4 gallons of water.

CITRUS SPRAY PROGRAMME

Time of application	Material	Quantity for 4 gals. water	For control of
1. Petal fall of main crop	Copper oxychloride ..	3 oz	Verrucosis and other fungous diseases
2. December	Repeat		
3. Mid February ..	Summer oil ..	1 pint	Scale insects
4. Late May	Copper oxychloride plus summer oil ..	3 oz 1 pint	Sooty mould Brown rot Hard wax scale

ground, the air immediately above this cold layer will be relatively cooler than where no tall growth is present. At "fruit level" this difference in temperature may be sufficient to cause damage which otherwise would not have occurred.

The mowing of grass or the maintenance of clean cultivation will contain the colder air level nearer to the earth's surface and consequently reduce somewhat this frost risk at fruit level.

Heating of Orchards

Commercial orchards are heated, but the use of oil burners in the home orchard, especially in urban areas, would cause a smoke nuisance to neighbours.

Effect of Urban Development on Frost Occurrence

Close urbanisation has been noted to modify climate slightly. In New Zealand this has been apparent in at least two areas where urbanisation has been rapid during the last 10 years.

This change concerns the home orchardist in new areas of close subdivision and intense building activity where late spring frosts affect plum and other early blossoms.

In areas which have previously suffered from such frosts it is highly probable that a large number of houses all contributing some heat to the surrounding air through chimneys from house fires and through other heating appliances will reduce the severity of late frosts which will cause damage or will prevent them. Home orchardists in these areas can profit by such changes by being able to plant earlier flowering varieties of fruit.

SPRING WORK IN THE HOME ORCHARD

The main diseases and pests can be controlled by the home orchardist if sprays are applied early enough. Too frequently diseases gain a hold before any measures are taken to combat them. Sprays should be applied for prevention rather than cure and the first spring sprays are therefore most important. The spray programmes above are a simple guide to the home orchardist for the control of the major diseases and pests.

Cultivation and Manuring

Cultivation should be completed before fruit set and fertilisers should be applied at the same time. If these are incorporated in the soil with this first cultivation, they become available to the tree in its earlier stages of growth, when most required. On light soils farmyard manure is the most suitable, or if this is not available, the incorporation of straw or green crops will help to build up the physical character of the soil. Any manure should contain the three major elements—nitrogen, phosphate, and potash. For the home orchard a simple mixture of 4 parts of blood and bone plus 1 part of sulphate of potash could be used at 1 to 4 lb per tree for young non-bearing trees, and from 4 to 8 lb per tree, according to size, for trees in full bearing.

Selection of Pig Breeding Stock

By I. H. OWTRAM,
Extension Officer,
Pig Husbandry,
Department of Agriculture,
Wellington

ALL pig producers who breed pigs have to replace their breeding stock fairly regularly, either by buying from another breeder or by selection from their own young stock. The average number of litters produced by breeding sows in New Zealand before they are replaced is six. Thus they remain in the herd for three years, and about one third of the sows are replaced each year. Boars are retained rather longer, four to five years being the average. As the financial success of the pig enterprise depends on the performance of the breeding stock, their selection is obviously of considerable importance.

AS about 90,000 breeding sows are in use, some 30,000 sows are replaced each year and also at least 2,000 boars. The quality of these animals is a key factor in the improvement of pig production.

Correct feeding and good management are essential, but will not give good results if the pigs have not the inherited qualities necessary to make efficient use of them. To illustrate this point a young wild pig caught in the bush and then fed and housed under the most skilful management will never produce a carcass suitable for the trade in either pork or bacon, nor will it show any profit to the farmer.

Two Questions

Two questions must be answered when animals for breeding are being selected; satisfactory answers to both are necessary.

[1] The first question has three parts. These are:

(a) Will they produce pigs having a good carcass, containing plenty of lean meat and the least possible amount of unwanted fat, and of the standard required by the trade?

(b) Will these pigs be fast growing so that they can be marketed in the shortest possible time?

(c) Will they produce and rear large litters of big healthy pigs?

[2] The second question is: Does the sow or boar being selected measure up in every way to the standards required in the live animal?

The answers to all three parts of the first question are obtained from production records, which are not the same thing as an extended pedigree. The answer to the second question is found by the most critical inspection of the animal that is a candidate for selection.

Production Records

Records covering litter production, growth rate, and carcass quality are necessary for both pedigree breeders and commercial pig farmers. Without them it is impossible to know what progress is being made or to find out where improvement is necessary.

It is neither difficult nor laborious to keep the necessary records. Firstly a record of the farrowing dates of all sows with the number of pigs born and the number weaned must be kept.

Photograph at left above by "New Zealand Farmer".

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This means that all sows must be identified, preferably by an earmark. Each litter should be marked with the same earmark as that carried by the sow which farrows them. The best time to do this is at three weeks old, when the boar pigs are castrated. The pigs in the litter can then be identified according to their breeding throughout their lives and as carcasses. As their date of farrowing is known, their age at slaughter can easily be obtained and so their rate of growth.

Carcass quality records can be obtained in several ways. The commercial pig producer who sells baconers on the hooks will get a very fair indication of the type of carcass he is producing from the grading results. More detailed information will be available from judging results for pigs entered in baconer and porker competitions. The pedigree breeder can enter the Pedigree Pig Improvement Scheme operated by the Department of Agriculture in conjunction with the New Zealand Pig Breeders' Association.

If a farmer is selecting animals for breeding from his stock and has been keeping records of his pig production on the lines indicated, he will by using all these three records together have a most valuable guide as to which members of his breeding herd are giving the best results.

If he is purchasing animals for the same purpose, he should demand production records of the strain or family to which the pigs under selection belong. Should these not be forthcoming, he should take his custom to a breeder who can and will furnish the necessary information.

Inspection of Live Animal

When selecting pigs for breeding, the sire and dam and as many close relatives as possible should be inspected.

Pigs cannot be bred by mathematics. If there are 10 pigs in a pen, there are 10 living individuals in that pen, all different, not 10 identical, mass-produced machines for converting skim milk into pig meat. It is this individuality that makes a close examination of the live animal necessary, however good the production records of the stock in question may be.

The following points should be looked for:

The Head

The head should be light in proportion to the body and wide between the ears and eyes, with a broad snout and light jowl. Faults such as crooked and undershot jaws should be looked for.

Feet and Legs

The legs must be straight and well placed, with plenty of width between them, and the hoofs must be even in size, the animal standing well up on the toes. The pasterns must be short and strong. Faults such as bandy legs, knock knees, unevenly developed toes, turned in toes, and weak pasterns are serious. Pigs with these defects should not be selected for breeding. An adult pig is a very heavy animal with very small feet in comparison to its size. If the feet and legs are in any way

["*Farmer and Stock-Breeder*"

An adult pig is a very heavy animal and must have good legs and feet to support this weight.

Records of the date of farrowing and number of pigs born and weaned must be kept.

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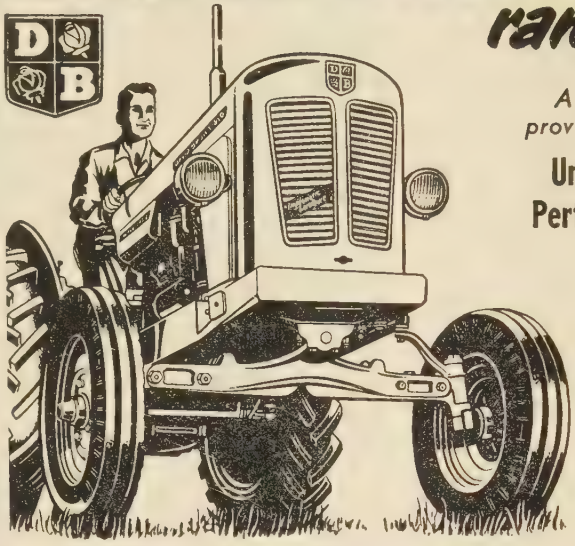

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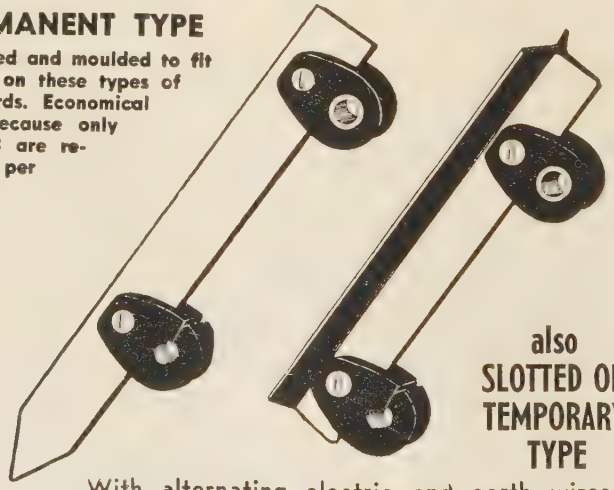

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faulty, trouble in the form of lameness and clumsiness in getting up and lying down will occur, with disastrous results for new-born litters.

Udder Development

A sow must have good udder development if she is to rear a good litter. Sows must have at least 12 evenly spaced and well developed teats set well forward. Undeveloped teats and inverted teats are serious faults and should disqualify a sow for selection.

The same applies to boars, whose teat placement must be carefully examined, because it will be passed on to their daughters. Again there should be at least 12 evenly spaced, well developed teats and at least three pairs of these should be in front of the navel.

A boar's testicles must be well developed and set low in the crutch. If they are not, it means that the hams are poorly developed.

The Shoulder

The neck should be reasonably short and free from crest. A heavy crest indicates a propensity to put on fat. The chest should be wide between the front legs, but not too deep. Excessive chest depth will give a badly balanced side.

The Neck

The shoulders must be level and light. An open shoulder in which the points of the shoulder blade are higher than the backbone must be avoided, as this type of shoulder is too heavy in proportion to the rest of the carcass. An open shoulder also often indicates weakness in constitution.

The Back

The back should be long, strong, and slightly arched from back of the ears to the tail setting. The loin should be full and strong and the sides long, flat, and even, not barrel shaped, and of good depth, giving a smooth, level line as seen looking along the side of the animal, with a straight underline.

The Hams

The hams should be broad as seen from the top and rear, full and well fleshed down to the hock, but free of excess fat, and with good length from the hip to the tail.

The Skin

Finally the skin should be soft and pliable and free from wrinkles. These wrinkles tend to show up in the cured side of bacon, detracting considerably from its appearance. The hair should be fine, straight, and plentiful.

When selecting sows or boars for use as breeding stock choose those that as nearly as possible fulfil these points and that are backed by satisfactory production records. Selection on these lines coupled with good feeding and management will lead to improved pig production and profits.

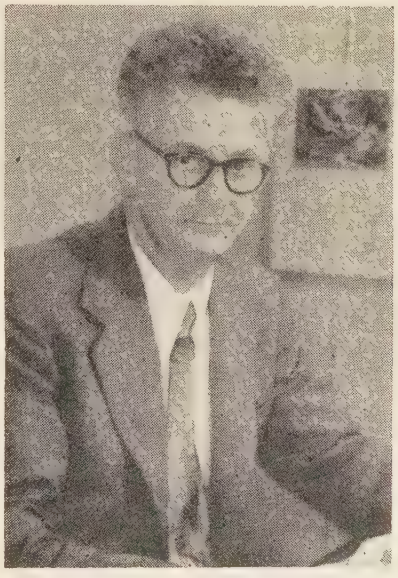
[*R. W. Orr*

Records of growth rate and carcass quality are most important.

New Zealand Scientist Initiates Preparation of World Soil Maps

AS a first step toward elimination of hunger among the world's peoples the Food and Agriculture Organization of United Nations is making an assessment of the food-producing potential of land throughout the world. The basic tools for doing this are world soil maps, and preparation of such maps was urged by Mr N. H. Taylor, Director of the Soil Bureau, Department of Scientific and Industrial Research, when in 1956 he was elected chairman of the commission of the International Soil Science Society which is concerned with soil mapping and classification.

Mr Taylor's suggestion was adopted and by the end of his four years in office soil maps on a scale of 1 : 5,000,000 were available for most regions of the world. The maps are by no means complete in detail, but for the first time there is sufficient information on which to base the United Nations assessment of the world's food production potential.



Mr N. H. Taylor.

Printing of Maps

Completion of such a basic task in four years is a great achievement and such an international project can seldom have been carried out so rapidly and effectively. Finishing and printing of maps are being pushed ahead and Mr Taylor went to Rome, headquarters of FAO, in June to assist with this work. It is planned to have some of the maps ready for exhibition at the International Soil Science Conference in New Zealand in November 1962.

Value to World Health Organization

Because of growing awareness of the importance of soils to the health of peoples the World Health Organization will use the maps in its plans for improving health standards. The United Nations Educational, Scientific, and Cultural Organization will also use them in agricultural education campaigns.

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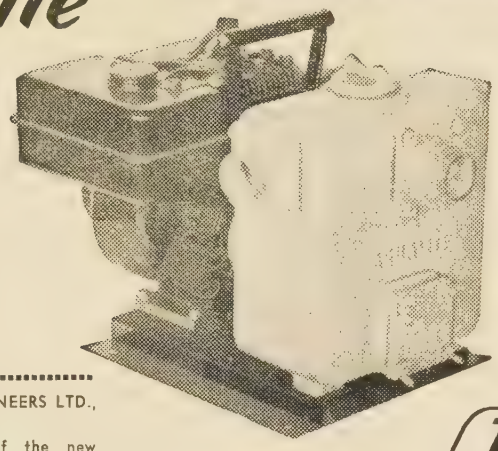

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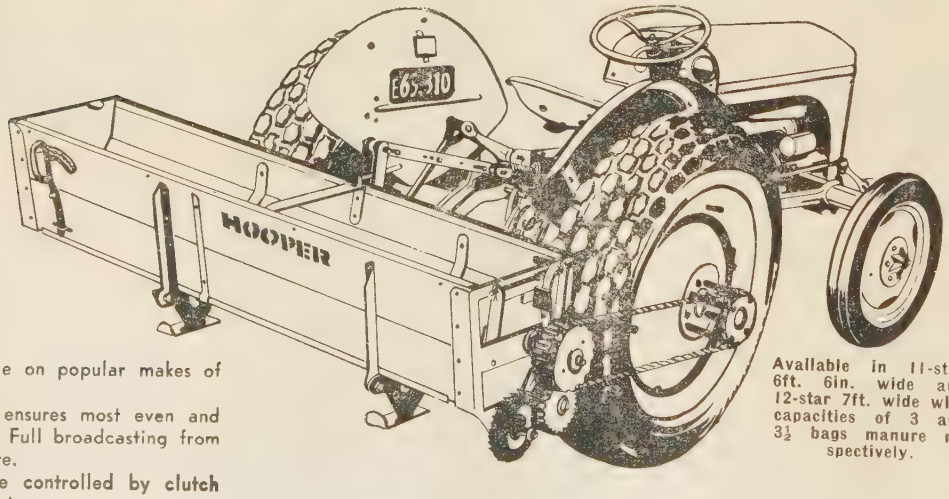

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Vegetable Growing for Home and Market Gardeners

By A. G. KENNELLY,
Horticultural Instructor,
Department of Agriculture,
Dunedin

ASPARAGUS has long been valued for its distinctive flavour and as a food. It is grown by relatively few home gardeners and commercial growers, and it is regarded by most commercial growers as a specialist crop. Nearly 2,000 acres are grown commercially in New Zealand, the most important area being Hawke's Bay, where 1,700 acres are grown for canning. Other commercial plantings are at Pukekohe, Katikati, Gisborne, Nelson, Blenheim, and Christchurch.

Planting 1-year-old asparagus crowns. →

Asparagus

[Over

ASPARAGUS (*Asparagus officinalis* var. *maritimus*) is expensive to bring into production, but if it is established on land free from perennial weeds, it can be maintained cheaply. It is harvested and marketed in spring and early summer, when in some areas there is not much income from other lines of production and when other crops do not compete for the labour available.

It is a vegetable that deserves to be planted more widely by home gardeners, because it is harvested at a time when fresh green vegetables are scarce in many home gardens, it is easy to grow, is very little troubled by pests and diseases, and is a fine quality vegetable that is at its best when used fresh from the garden.

Asparagus is grown for its tender shoots that develop in spring from the rhizomes or crowns. It is a long-lived perennial which develops an extensive root system. In deep, moist, fertile, well drained, free-working soils, beds established from selected, well cared for crowns may remain in high production for 20 years or longer, though the average life of a bed is usually 12 to 15 years, after which production falls off progressively. The best asparagus is usually harvested from the fourth to the tenth year, though individual plants or strains differ greatly in this respect. Short-lived plants or strains may be very productive for five or six years and then decline below commercial levels.

The underground parts consist of numerous stems, or the crowns and their lateral extensions, fleshy roots, and fibrous roots. The lateral growths arise from the central parts of the crown and may grow nearly horizontally outward in friable soil, but grow almost vertically toward the surface if the crown is planted in hard soil or too deeply.

The buds are borne on the crowns, arranged in compact order on the upper surfaces. A very vigorous crown may produce 40 or more buds annually. The fleshy roots arise from crowns and grow deeply and widely. They function chiefly as storage stems and give up the food to the shoots in spring. They lengthen for about three or four years and are replaced by new ones that arise each year just behind the terminal buds of the rhizomes. Masses of wide and deep-spreading fibrous roots develop from the fleshy roots in spring and die in autumn.

The edible spears develop from lateral buds formed the previous year on the fleshy storage stems, which branch and elongate a few inches each year, faster in young plants than in old ones. The area of spear production on a fairly old, well established crown is usually less than 2 ft.

Asparagus is usually grown for three years before it is cut much and the long, relatively unproductive period probably deters some commercial gardeners from establishing beds. Inter-cropping is used to some extent to compensate for this delay in returns from asparagus, but it interferes with the filling in of the asparagus rows

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and increases the amount of hand work. Fern growth may be considerable and may make the growing of even quick-maturing inter-row crops difficult. Crops such as lettuce, early cabbage, dwarf beans, potatoes, and even dwarf tomatoes have been used for inter-cropping in areas suited to them.

In Hawke's Bay establishment costs for asparagus are about £120 per acre.

Site and Soil

As asparagus is a long-lived crop, the site for it should be suitable for many years. Shelter may be needed in exposed areas, though it should not overshadow the crop, nor should roots of trees or hedges reach the beds. Strong winds for a day during the cutting season may cause crooked spears.

Asparagus will grow in a wide range of soils from predominantly sandy soils to clay soils, but heavy clay soils warm too slowly and are difficult to manage. They do not drain readily and they produce a higher proportion of rough, crooked spears of poor keeping quality. Shallow soils with hard subsoils are unsuitable.

Sandy loams that warm readily produce early crops and, because they are loose and friable, allow the spears to grow straight. They are best for heavy yields over the first few years, but plants do not last in production as long as on heavier, deep, fertile, moist, well drained soils unless they are well fertilised.

The natural habitat of asparagus is on the edge of marshes, where land may be mainly sand with some humus and contain relatively large amounts of salts. Asparagus tolerates rather acid conditions, but generally does well in a nearly neutral or even slightly alkaline soil. Some growers apply lime regularly and consider that their crops benefit from it. Its value to the crop depends on the condition of the soil.

Manure

Because of its very large root system asparagus requires liberal amounts of fertiliser to enable it to maintain growth that results in heavy crops. Organic manure such as poultry manure gives good results if free from weed seeds, but asparagus will grow satisfactorily without organic manure if enough fertiliser is applied. Most commercial growers in New Zealand apply fertiliser in early spring and again after cutting is finished in dressings of up to 10 cwt to the acre, but some also apply fertiliser during the cutting season. There is considerable variation in the kind and rate of fertiliser applied.

Nitrogenous fertilisers (sulphate of ammonia, nitrate of soda, or dried blood) may be applied alone or more often in combination with superphosphate, or blood and bone may be given. Potash at 1 cwt to the acre is also usually included where a complete fertiliser is required.

Common salt used to be considered essential for asparagus and in moderate amounts will not harm it. Its value to the crop is doubtful and most asparagus is grown without it. If, however, sodium nitrate and potassium chloride (muriate) are used, both the elements of common salt are supplied.

Varieties

Two factors make the term "variety" rather a misnomer when applied to asparagus. Male and female flowers are borne on separate plants, and under commercial conditions seed is saved from robust female plants without regard to the source of pollen. The very great variability found in commercial lines is therefore not surprising. Growers who raise their own plants select the most vigorous one-year-old crowns for planting out.

Mary Washington and **Conovers Colossal** mature together and good beds yield about 1½ tons to the acre when well established. These varieties produce average-sized spears and are considered suitable for canning as well as for market. Cutting usually begins about the third year and full bearing is reached about the fifth year.

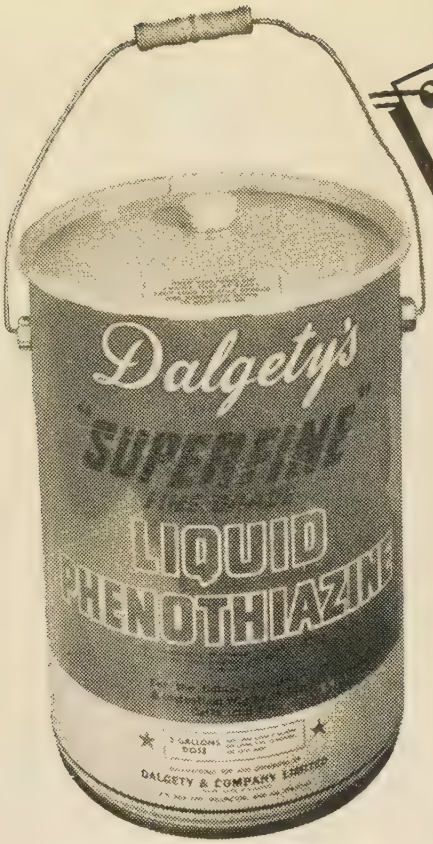
Paradise is increasing in popularity. Spears tend to be stouter, lighter in colour, and milder in flavour than those of the two varieties named above, though the differences in colour and flavour are not always evident. Paradise is a vigorous variety and a small cut is taken the second year after establishment and in particularly vigorous plantations some growers have taken a light harvest the first year. Plants do not usually come into full bearing until about the fifth year, when yields of 2 tons per acre have been obtained. It is grown for canning as well as for market.

No. 500, an improved Mary Washington, is a robust variety and produces well. According to processors, it will stand in the field a day longer than other varieties without the scales opening, which is an advantage in helping to regulate supplies to a factory.

Coniston (or the Coniston strain of K.B.F.) has been introduced to New Zealand from a Christchurch garden known as "Coniston". Not enough is known about the type of spear it produces to describe all its commercial

VARIETIES OF ASPARAGUS

A desirable type of crown produced 10 months from sowing. The buds are strong and healthy and the root system is well developed.



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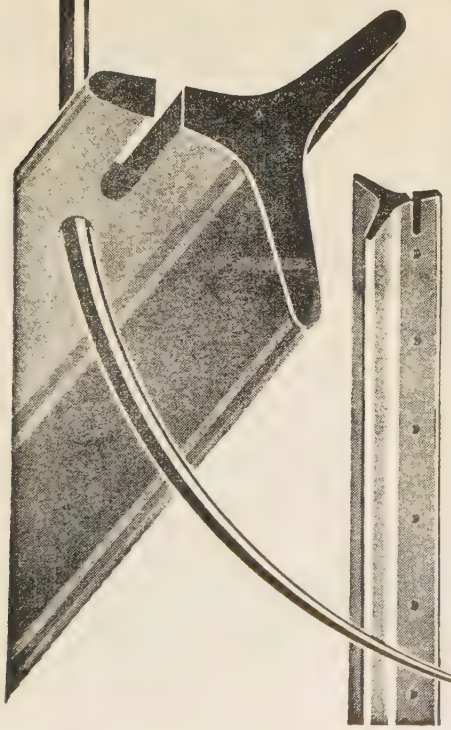

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Rows of asparagus seedlings sown 1 ft apart and kept weed free with a wheel hoe. Seedlings are best thinned to about 4 in. to produce strong yearling crowns.

possibilities, but it appears to be a very vigorous strain with desirable qualities.

Plant Raising and Planting

Some growers raise their own plants. Seed is sown in spring as soon as the ground is in condition, usually in August or September according to district. Plant beds are well fertilised and cultivated and seed is sown to produce plants about 3 to 5 in. apart in rows 12 to 18 in. apart, or the plants are thinned to give a stand of plants at 3 to 5 in. intervals.

Asparagus seed germinates slowly, especially at low temperatures. Germination can usually be speeded by soaking the seed for three to five days at about 85 degrees F to assist absorption of water rather than to break dormancy. Seed should not be allowed to sprout and should be dried slightly before sowing.

Weed control is necessary during growth. The importance of obtaining seed of only the very best stock and using only the best seedlings cannot be overstressed. In Hawke's Bay one-year-old plants cost between £6 and £7 per 1,000.

One-year plants are best. They should be set out into a rich, moist, well cultivated soil as soon as possible after lifting from the nursery rows. If planting must be deferred after lifting, the crowns should be stored at temperatures of from 35 to 40 degrees F, and should be prevented from drying out.

Crowns are sometimes dug with a potato digger or ploughed out, but there should be a minimum of breakage of roots; only the best should be planted. Trimming should be confined to damaged sections only, as loss of roots reduces plant vigour. Many plants are likely to fail unless good plants that have not been checked are set out in good soil conditions and a good situation.

Adequate preparation of land for planting is very important. It should be free from perennial weeds and worked to a good tilth. Many growers build up the fertility and texture of their soils by green cropping and heavy dressings of organic manure, but the organic content of the soil is not important for asparagus, except for lightening very heavy soils and improving light, very sandy soils.

Plants are usually set 6 to 8 in. deep, though 10 in. is not uncommon. In sandy loams or peat soils planting should be deeper than on heavier soils. Rows are 5 to 7 ft apart with the crowns 12 to 24 in. apart; 18 in. is generally preferred.

Following is the number of plants to the acre at different spacings:

5 ft x 1½ ft = 5,808	5 ft x 1 ft = 8,712
6 ft x 1½ ft = 4,840	6 ft x 1 ft = 7,260
7 ft x 1½ ft = 4,148	7 ft x 1 ft = 6,223

The trend is to plant more shallowly than previously. Shallow planting promotes more vigorous growth and a large, early yield, as the soil warms more quickly near the surface. The crowns are unlikely to come any closer to the surface than if they were planted deeper, unless the soil is cold and the water table is high. Too shallow planting in sandy or peat soil may result in the crowns being exposed by wind erosion.

Small areas are planted by hand, but on large areas a trench is ploughed out a little deeper than required and the plants set by hand with the roots spread over 2 or 3 in. of loose soil worked into the bottom of the trench. The plants are at once covered with one or two inches of soil and firmed. If more is put over them, there is a chance of the weaker plants being smothered.

Planting is usually done in August, but may be done earlier or later if the crowns are dormant and ground conditions are favourable. Subsoiling at 4 to 5 ft intervals may be necessary unless the subsoil is very well drained, but generally land with poorly drained subsoil should be avoided.

When the fern is 6 to 8 in. high soil is worked into the trench an inch or two at a time by cultivation. Usually by mid summer the trench is closed and the whole area reasonably level. In late autumn the yellow fern is cut and burnt or disced in.

Weed Control

In winter or early spring two or three discings are given as needed with the discs set very shallow. Finally a light moulding of soil is thrown up over the lines of crowns. Discing in the fern adds organic matter and does not present a problem of germinating seed in spring, as cultivation should destroy the seedlings. Some growers burn the fern to eliminate the seed from which seedlings may establish to the detriment of the bed. They then usually apply organic matter to the beds.

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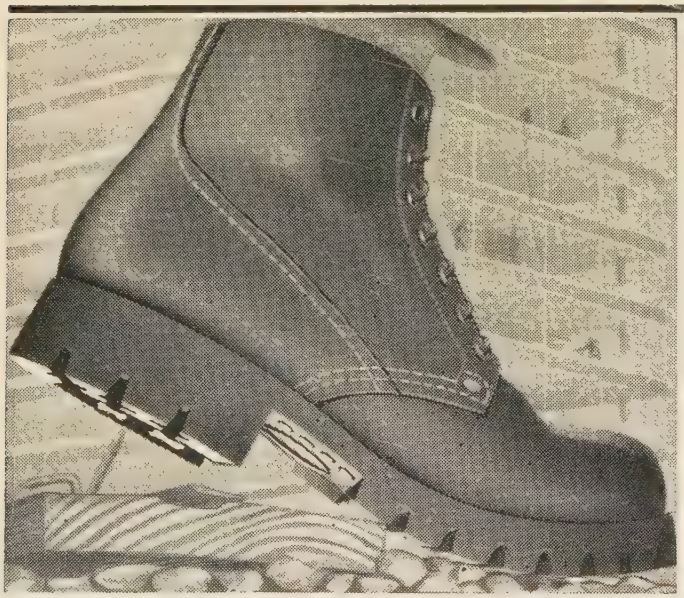

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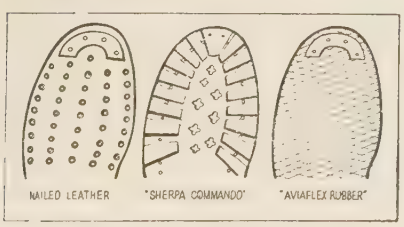

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In some districts CMU at 3 to 5 lb to the acre is used as a pre-emergence spray and TCA at 35 to 40 lb per acre or even higher rates for grass control. MCPB or 2,4-D may be applied after cutting to control Californian thistle. CIPC has been used by a few growers with varying results.

Harvesting

Harvesting from new beds usually begins with a light cutting of about two weeks in the third year after establishment, though from vigorous plants in favourable soil some growers start harvesting the first or second year. Cutting must not be started too early in the life of the bed and heavy cutting must not be done until plants are well established. Too early cutting may reduce the productiveness of the bed.

In well established beds the cutting season usually lasts about two months. Cutting should be stopped in time to allow the plants to develop strong, vigorous tops which will manufacture and store enough food in the root system for future crops.

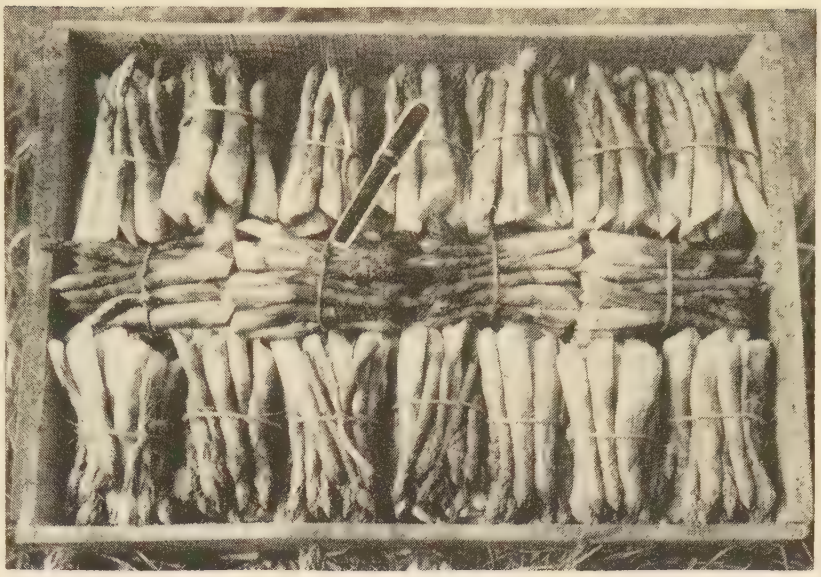
Spears are cut when from 6 to about 9 in. high with a sharp chisel, knife, or special tool with a V-shaped cutting face. Beds are cut over two or three times a week according to growth.

Marketing

Asparagus spears are graded according to thickness, cut to length (which may vary from 6 to 9 in.), and made up into ½ lb or 1 lb bundles according to market. Bundles are usually secured either with flax or rubber bands and are often stood upright in shallow trays of water to keep them turgid. They may be marketed as bundles in cases. A bushel case contains about 38 lb, a pear case about 30 lb, and a half case about 15 lb.

Yields

Beds may yield as high as 2 tons per acre, but 1 to 1½ tons to the acre is considered very good; many good commercial beds yield ¾ to 1 ton to the acre.



Bunches of asparagus boxed and ready for lidding before being sent to market. (The fountain pen gives an indication of the length and thickness of the spears.)

Diseases and Pests

Asparagus Rust

Asparagus rust (*Puccinia asparagi* D.C.) results in rusty spots on the stems and branches of the fern. Great amounts of rusty brown powder develop on the fern in late summer and black streaks on the stems and needles in autumn. The fern dies prematurely and this checks the plants severely and reduces production of marketable spears in the following season. Wind is the main agent in the dissemination of spores within an area and rain contributes to spread of rust on individual plants.

Where there is only a slight amount of rust the fern can be cut to the ground early and burnt. Fungicides (such as sulphur, ferbam, zineb, phenyl mercury triethanol ammonium lactate, copper-zinc-chromate, tribasic copper sulphate, and combinations of some of these) applied as dusts or sprays were not effective in trials overseas in controlling asparagus rust. It was not possible to maintain an effective cover on the new asparagus growth even when fungicides were applied every two days. At present it is not possible to recommend a fungicide which controls the disease.

In trials at the University of Illinois Agricultural Experiment Station the so-called "rust resistant" Washington varieties were very susceptible. An eradicant fungicide, dinitro-o-cresol, did not prevent late outbreaks of rust. A parasite (*Darluca filum*) of the rust fungus was found not to have much control effect during years when epidemics of rust occurred.

However, severity of rust infections can be reduced if planting and harvesting programmes of all growers in a particular area are coordinated and if all volunteer asparagus is eliminated. Asparagus should not be snapped off in harvesting, because if 8 in. or more of the stalk remains attached to the crown after the spear is snapped, this stub usually produces adventitious growth which is susceptible to infection. The basal portion of the spear thus becomes a potential source of primary infection in cut fields. Stubs shorter than 8 in. usually wither and die.

New Zealand reports on the "resistant" Washington varieties are contradictory. In some districts the varieties appear to be resistant and in others not. There are probably different strains of the disease and also different strains of "resistant" asparagus.

Rots

Rots such as those caused by *Botrytis* sp. and *Erwinia* sp. occasionally damage asparagus. There is no effective control in commercial crops. Botrytis in most other crops can be controlled most effectively by allowing free movement of air round plants and by spraying with thiram at 2 lb per 100 gallons, but this is not usually practicable with asparagus.

Erwinia is an organism which causes soft rots. Hygiene is most important in its control. Infected material should be destroyed and, where this is practicable, aeration should be improved.

Verticillium Wilt

Verticillium wilt is a soil-inhabiting fungus which enters the tissues of healthy roots and grows up the conducting vessels of the stem, restricting the movement of moisture, causing the plant to wilt and eventually to die. In the restricted area of a glasshouse the soil can be sterilised, but soil sterilisation is usually too costly in the open to be worth while. As the organism may remain in the soil for several years, only crops that are immune to it should be grown where it is known to be present.

Slugs

Slugs are occasionally troublesome on asparagus beds and can be controlled by a bait consisting of 1 oz of metaldehyde to 3 lb of bran, which must be mixed thoroughly. The metaldehyde must be finely ground.

The bait may be used dry or slightly damped, but not so that the flakes stick

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together. It can be broadcast thinly or in very small heaps about 12 in. apart. Rain reduces its effectiveness and heavy rain may make it ineffective. The bait should preferably be applied on a mild evening when the soil is moist. Dry or frosty conditions are unsuitable.

Porina Caterpillar

Porina caterpillar (*Oxycanus* sp.) occasionally damages asparagus. The caterpillars hatch from an egg that is small, oval, and creamy white when laid, but turns jet black shortly after. The caterpillars are tiny when they first emerge, but from January on they construct almost vertical tunnels 6 to 10 in. deep in which they shelter during the day to emerge at night to feed on plant parts. Fully grown caterpillars may be 2¾ in. long. Caterpillars can be controlled by 50 per cent DDT applied at 2 to 4 lb per acre in late autumn or early spring.

Porina (*Oxycanus*) caterpillar, which sometimes attacks asparagus, in the tunnel in which it shelters during the day.

Frost

Late frost may damage the shoots of asparagus. When the tender young shoots are severely injured by frost the upper part becomes limp and the tissues soon turn watery and blacken. Affected shoots will continue to lengthen from the base, but the frost-damaged section dries out, becomes thin, withered, straw coloured, and bent over.

Partially injured shoots become slightly shrivelled and constricted about soil level so that an inch or two of the top remains green, but below this the shoot is withered. Some slightly affected shoots are often difficult to recognise, but if left they slowly deteriorate and become malformed. They may not be very suitable for the table, though they may appear fairly normal just after the frost damage. Loose straw or paper funnels have been used on small areas to give protection from frost.

September Work in the Home Garden

By A. G. KENNELLY

HARDY vegetables should grow well in most home gardens in September, but soil should be well prepared and in good condition for sowing. Heavy frosts and cold periods can still be expected in most districts and as periods of low temperature force many hardy vegetables into premature seed formation and are sometimes conducive to seed or seedling rot, the extent of sowing should be governed by site, soil, and situation.

IN a few of the more favoured northern areas frost-tender vegetables can be sown or planted late in the month, but soil temperatures are still rather low and killing frost is still possible. In most districts it is much too early to sow or plant frost-tender vegetables, and the ground should be in good condition for sowing even hardy vegetables. Soil for seed sowing should not be too wet and should lie reasonably well to the sun and be worked up to a fine tilth.

For most crops, soil should be enriched before planting or sowing. The amount of plant food needed depends on the condition of the soil and to some extent on the crop. Organic matter should be added to all soils in the form of a green crop such as barley, oats, mustard, or lupins or farmyard or poultry manure, compost, rotted straw, leaves, or other vegetation. Organic matter improves the texture of the soil and so improves aeration, drainage, and the moisture- and plant-food holding capacity of the soil.

To get good growth, fertilisers should be given containing the mineral elements the plants need most. Many commercial growers apply fertilisers at rates of up to a ton or more to the acre. A ton to the acre is 7½ oz to the square yard and is much more than many home gardeners use. With good soil, the key to good production in the vegetable garden is cultivation (mainly weed control) and manuring.

Many combinations of fertilisers can be used. Any in which the plant food elements are reasonably balanced should give satisfactory results, but one of the simplest mixtures is 6 parts of blood and bone and 1 part of muriate or sulphate of potash. This is a balanced fertiliser and can be applied at from 2 to 8 oz to the square yard according to need. It should be well worked into the root area, or it can be broadcast and worked in over the whole vegetable garden shortly before planting or sowing is begun.

Leafy vegetables need a good deal of nitrogen, so that the above mixture, if used as a base dressing, should be supplemented with side dressings of a nitrogenous fertiliser such as sulphate of ammonia, dried blood, or nitrate of soda or with a complete fertiliser high in nitrogen.

Beetroot

A successional or main-crop sowing of beetroot can now be made. However, beet is a rather sensitive crop and unless temperatures are reasonably high many plants are likely to go to seed prematurely. Early sowings are usually confined to the flat, deep oblate, or round types, which are harvested early.

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Seed should be sown thinly to avoid the need for thinning. Beet are likely to be lopsided if crowded, but fairly large thinnings may be pulled and the tops used as beet greens. Some gardeners may like to try the common overseas practice of thinning again later by pulling alternate plants and cooking them complete with tops as baby beets.

Sowing

A beet "seed" may be one or several seeds in a cluster or seed ball, depending on whether it was formed from one or several flowers. Even with thin sowing, therefore, there may be thick emergence because of the germination of several attached seeds. Seeds should be sown ½ in. deep in rows 12 to 15 in. apart and the roots thinned where necessary to 2 to 4 in. apart in the rows according to the size of the fully grown beet.

Soil and Manure

Soil and manurial requirements are generally similar to those for carrots. Beetroot requires plenty of moisture and should be grown in an open, sunny place, as it rarely thrives if shaded even if soil conditions are excellent. It transplants well if carefully lifted and replanted into moist soil; replanted thinnings usually mature very little later than the rows from which they were lifted.

The highest quality beetroot is grown in the lighter soils. For best results heavy dressings of organic manure should be applied to the previous crop, though on poor soils moderate dressings of well rotted organic manure can be thoroughly worked in when soil is being cultivated to the fine tilth which is desirable before sowing.

The application of additional plant food depends on the soil. Soil requirements vary greatly, but if an artificial fertiliser is required, one with a ratio of 1 part of nitrogen, 2 to 4 parts of phosphoric acid, and 1 part of potash applied at 1½ to 3 oz per square yard is likely to suit a very wide range of conditions.

Varieties

Flat: Flat Egyptian.

Short top (flat at the top or bottom with sides rounded): Crosby Egyptian, Early Wonder, Light Red Crosby.

Deep oblate to round globular or oval: Crimson Globe, Detroit Dark Red, Greentop Bunching, Early Wonder, Crimson King.

Half long: Half Long Blood.

Long: Long Dark Blood.

Non-bleeding beet, which, as its name implies, does not bleed when cut, is increasing in favour, as it retains its colour even when cut into pieces before cooking.

SOWING AND PLANTING

SOW

Asparagus	Where ground is well drained.
Beetroot	
Broad beans (late sowing only where soils do not dry out)	
Brussels sprouts	
Carrots	
Cauliflowers	
Chinese cabbages	
Cress	
Celeriac	
Summer cabbages	
Kohl rabi	
Leeks	
Lettuces	
Mustard greens	
Onions	
Parsnips	
Parsley	
Peas	
Radishes	
Salsify	
Scorzonera	
Silver beet or Swiss chard	
Perpetual spinach beet	
Spinach	
Turnips	
Most other hardy vegetables	

PLANT OUT

Cauliflowers
Summer cabbages
Jerusalem artichokes
Lettuces
Onions
Potatoes
Potatoes (main crop in warmer districts only)
Rhubarb (in colder districts)
Shallots
Silver beet

UNDER GLASS

Sow celery, cucumbers, egg plants, melons, marrows, peppers, tomatoes	Early or late in September, according to district and maturity requirements.
Force kumaras to obtain rooted shoots	

[*Orr*

Beetroot is delicious if pulled at this stage, but these plants are too close for well shaped roots to develop.

Carrots

Carrot seed should be sown ½ in. deep in rows 12 to 15 in. apart. In light soil thinning of most varieties is unneces-

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sary. In heavier soils which tend to compact, or if large roots are grown, plants can be thinned 2 to 4 in. apart. A quarter of an ounce of seed will sow about 100 ft of row.

Good varieties for the home garden include Nantes, Morses Bunching, Red Cored Chantenay, and Taranaki Strong Top.

Celeriac

Celeriac has a turnip-like root with a characteristic celery flavour. The roots, which are used mainly, may be boiled, used in stews, or sliced and eaten raw as a substitute for celery in salads. Even the leaf stalks can be used when they have developed well.

Seed may be sown now, particularly as celeriac is not as well known as celery and few seedsmen sell plants, though most sell seed.

The soil should be rich so that plants make vigorous, continuous growth. During cultivation side shoots should be removed and the soil dragged away from the bulbous roots, which should be kept trimmed of all suckers, as they tend to cause unshapely development.

Varieties include Celeriac and Giant Smooth Prague.

Chinese Cabbage

Chinese cabbage is somewhat like cos or romaine lettuce, but the size of its oval, elongated head is usually nearer that of silver beet. It is sometimes called lettuce-cabbage, as the texture of its leaves is more like that of lettuce than that of an ordinary cabbage. Another name is celery-cabbage because of its flavour and because some of the forms resemble celery.

Chinese cabbage may be cooked or eaten raw. The inside blanched leaves and heavy but tender midribs have a delicate celery-lettuce flavour.

The plant is tender and quick growing, the commoner varieties maturing in good conditions in about 70 to 90 days. It should be treated like lettuce, but as it grows much bigger, it needs wider spacing.

Onions

Onions are one of the few vegetables which usually do well after a member of their own family such as leeks or shallots has been grown in the same ground. However, onions should not follow onions or leeks if there has been an appreciable amount of disease present. One advantage of having a special plot for onions is that the ground can be specially enriched and under such conditions onions are likely to do very well.

Where main-crop onions are usually sown in spring, seed should be sown as soon as ground conditions are favourable. Though varieties and cultural practices have an important bearing on production, fairly heavy soils usually produce good keeping but relatively slow-maturing onions and sandy soils quick-maturing onions that are generally of poorer keeping quality.

Onions require a slowly available supply of nitrogen, and on most soils crops will benefit from a heavy dressing of stable or farmyard manure applied in autumn and to which has been added (to balance its nitrogen and potash content) about 1/30 part by weight of superphosphate. If onions of good keeping quality are required, it is not advisable to apply in spring excessive quantities of organic manure which contain a considerable amount of nitrogen, as bulbs may be stimulated into excessive leaf growth and weeds are liable to be troublesome.

[Orr

Celeriac is a good substitute for celery. Plants may have to be raised by the home gardener because though seed can usually be bought, plants are not readily available. Seed can be sown in September.

Few home gardeners are likely to have much farmyard manure, but available compost should be applied with a complete fertiliser at about 3 to 6 oz a square yard. Because of the great variation in soils and their condition throughout New Zealand only local experience can indicate fertiliser requirements. The seedbed should be worked down to a fine, firm tilth and seed sown thinly ½ in. deep in rows 12 to 15 in. apart.

Good varieties include Ailsa Craig and Straw Spanish (both early) and Pukekohe Long Keeper (particularly suitable for storage).

Peas

To have peas at their best over a fairly long period successional sowings must be made. Peas do well in cool, well drained soils rich in humus. As they repay good cultural methods, the ground should be deeply dug and manured, preferably some time before sowing, with organic material such as compost or farmyard manure. A complete fertiliser (or if the soil is in good condition a dressing of 2 to 3 oz of superphosphate to the square yard) can be well worked into the soil before sowing.

One pound of pea seed is sufficient for about 100 ft of row.

Nassella Tussock Found in Central Otago

A SMALL infestation of nassella tussock was found in June on a farm near Matakanui, Central Otago. Thirty-five plants were dug up and burnt by Department of Agriculture officers.

The plants, which were growing beside a water race, were noticed by the Otago Catchment Board's farm planning officer (Mr W. Ramsay), and the Botany Division of the Department of Scientific and Industrial Research confirmed that they were nassella tussock. After all plants had been eradicated a search was made up and down the water race and over surrounding country for others, but no more were found. As the plants discovered were growing seed heads, further inspections of the area will be made for possible seedlings.

As far as is known the nassella plants are the first to be found in Central Otago. Runholders in the area should keep a close watch for this serious weed and report to the Department the finding of any plants which look like it.

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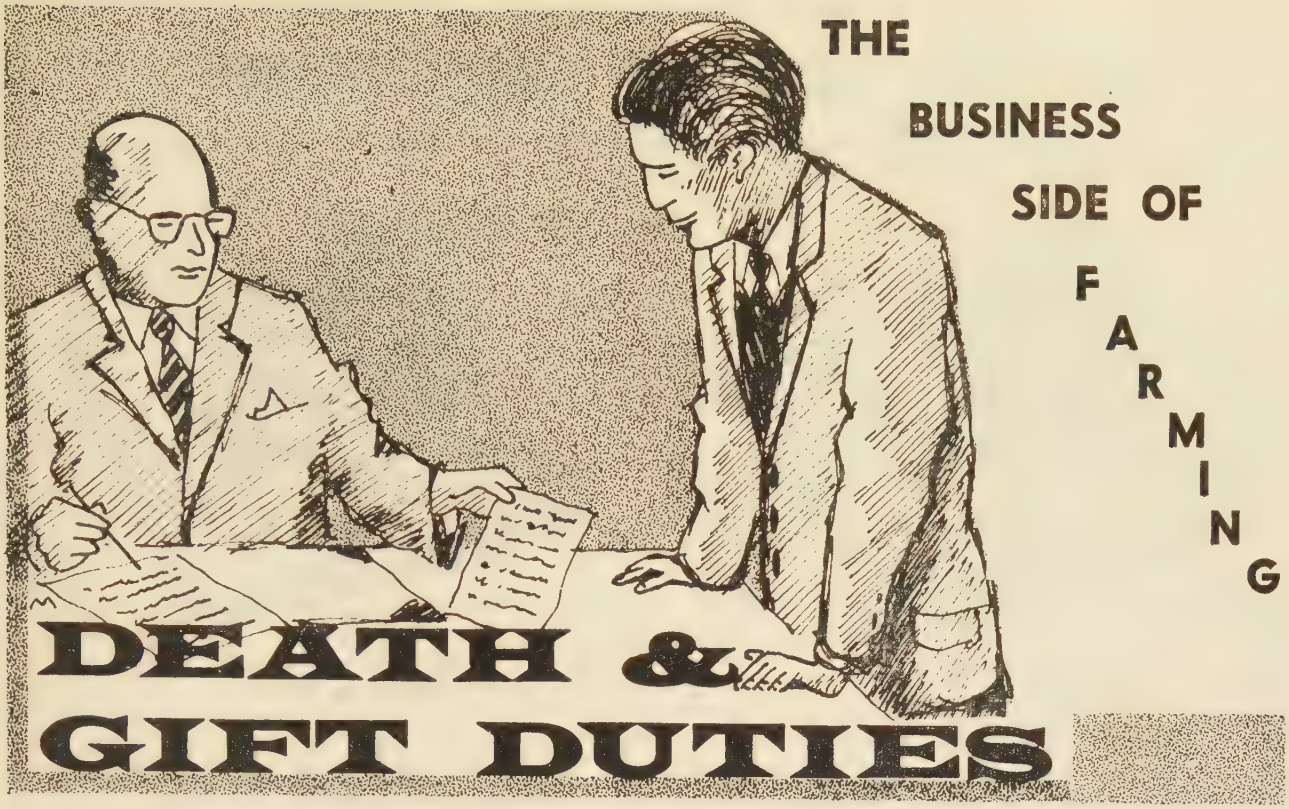

THE BUSINESS SIDE OF FARMING

DEATH & GIFT DUTIES

By R. I. C. MACPHERSON,
Farm Advisory Officer (Economics), Department of Agriculture, Auckland

NEITHER death duties (or, as they are now called, estate duties) nor gift duties may seem a very pleasant subject. However, this should not be allowed to cloud their importance to property owners and particularly to farmers.

LIKE other business people many farmers today started in a very small way, but through hard work and good farm management have built up assets which far exceed their original expectations. This growth of assets has also been accentuated during the post-war years by inflated land values and rising stock prices until current values of dairy farms range from about £10,000 to £20,000, and those of small but intensive sheep farms lie between £20,000 and £40,000.

During their active working life most farmers will put the major part of their profits back on to the land. This, of course, is how fertility and production are increased and how, under favourable economic conditions, the prosperity of both the farmers and the country as a whole is improved. However, the individual farmer should not lose sight of the fact that during his progress his asset is increasing and he is getting older. Thus the unexpected death of a farmer whose affairs have not been prepared to meet estate duties may result in a heavy mortgage having to be placed on the farm, a situation which might largely have been avoided by wise planning.

The rates of estate duty increase steadily with the rise in value of the estate assets. The following table illustrates the magnitude of present-day estate duties in estates not entitled to the allowances for widows and infant children mentioned later in this article:

Dutiable estate value	Duty payable	Percentage of estate
£	£	
1,000	Nil	Nil
1,100	4	0.36
3,000	90	3
3,100	97	3.13
5,000	250	5
10,000	1,000	10
15,000	2,250	15
20,000	4,000	20
25,000	6,250	25
30,000	9,000	30
40,000	15,000	37.5
50,000	21,000	42
100,000	51,000	51

These figures show how important it is for a farmer to have a fairly accurate idea of what his dutiable estate is likely to be and how the duty can be met without having a crippling effect on the farm's earning capacity for his family. Apart from estate duty the property of a deceased farmer may also require the additional expenses of employed labour and its accommodation. If it is felt that these matters have not been properly looked into and arranged for as adequately as possible, they should be given prompt attention.

Planning to minimise the effects of estate duty is an extremely complicated business and should not be attempted without expert guidance and assistance such as can be obtained from a solicitor, an accountant, or one of the insurance or trust organisations which specialise in this work.

Reliefs and Exemptions

Under the Estate Duties Act and its Amendments a number of reliefs and exemptions are applicable in certain circumstances. One of the most important ones for most farmers will be the widow's and infant children's exemption, which may considerably relieve the duty for estates up to £30,000 and to a gradually diminishing degree for estates between £30,000 and £60,000, at which point the exemption

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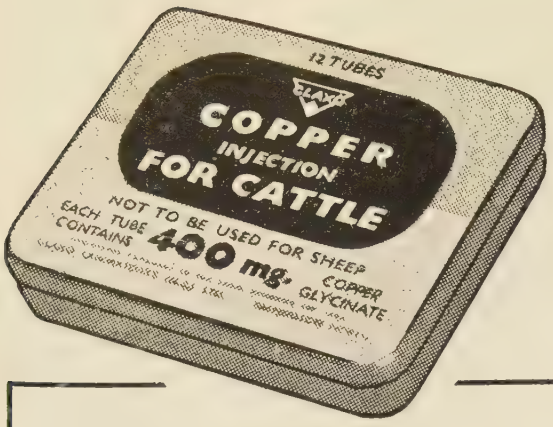
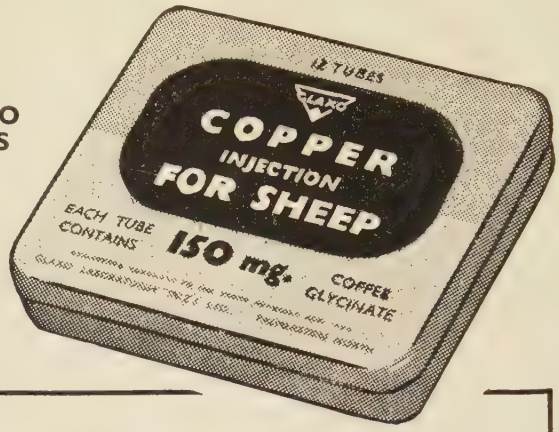
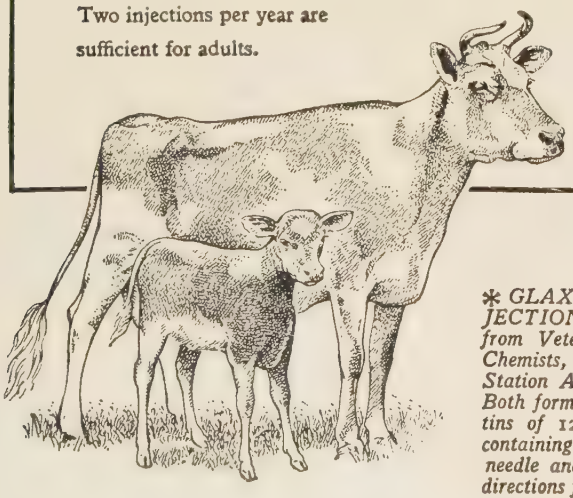


IN TWO FORMS



CATTLE

Copper deficiency in cattle, whether caused by lack of copper or the anti-copper action of excess molybdenum in pasture, causes retarded growth, low productivity, bone fragility and, sometimes, change of colour. These conditions may be prevented safely and economically by using Glaxo Copper Injection for Cattle. For calves the first injection should be given at marking or weaning muster, followed by two further injections at three monthly intervals. Two injections per year are sufficient for adults.



SHEEP

With the exception of a loss of crimp in the wool of Merinos or half-breeds, adult sheep do not show symptoms of copper deficiency. However, lambs born of ewes suffering from copper deficiency have fragile bones and sometimes develop ataxia. The latter condition cannot be treated but prevention can be achieved by supplying the ewe with adequate copper. One injection of Glaxo Copper Injection for Sheep should be given to the ewe, preferably a few weeks before lambing.

* *GLAXO COPPER INJECTIONS are available from Veterinary Surgeons, Chemists, and Stock and Station Agents everywhere. Both forms are presented in tins of 12 tubes, each tin containing one hypodermic needle and a leaflet giving directions for use.*

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ceases to be effective. One result of this exemption is that any estate under £7,500 left entirely to the deceased's widow is totally exempt from duty.

Before estate duties had reached their present high level it was quite common for a farmer to leave his whole estate to his wife and she in turn would leave it to her children. As the widow's sole property it was thus subject to another estate duty on her death, and though there are varying degrees of relief allowed from "successive estate duties" if a successor dies in less than five years, generally this is a situation to be avoided, particularly if the estate is a large one.

A specialist may suggest one or a combination of various methods to prevent the estate duty from endangering a family farm. The only real way to reduce estate duty, however, is to reduce the size of the estate.

If the farmer and his advisers decide that this should be done, two or three methods will probably come under consideration. These will be gifting, prepayment of estate duties, or just plain spending. The last two and especially the last depend on how much cash can be raised, particularly as many farmers put all their spare profits back into their property. Some may have to consider gifting if they wish to reduce the size of their estate.

Hazards of Gifting

Ironical as it may seem to anyone who has built up an asset over many years and decides that some of it should be given away, gifting is not as easy as it may at first appear. The Estate and Gift Duties Act lays down such detailed provisions as to what constitutes a gift and when exemptions are permissible that no farmer should consider making a gift of any size without first obtaining expert advice.

Gifts totalling up to £500 may be made free in any 12-month period, but where the gifts (except certain specially exempted types of gifts) to several persons, or to one person, total more than £500, gift duty will be payable. Furthermore outright gifts made within three years of the donor's death may be included in his dutiable estate. Estate duty will be calculated on them, but to avoid the same property being doubly taxed, due allowance is made for gift duty already paid or payable on such of the gifts as were large enough to be liable for gift duty.

Gifts to charity are excluded as well as those where the total given to one person in one year is £50 or less. Gifts made more than three years before death are not included in the dutiable estate unless the deceased "tagged" them in some way, such as retaining an interest in the assets given away or the right to restore such assets to himself. Such gifts made at any time are included in the estate. These are of course matters for legal interpretation.

The following are examples of the current gift duties rates.

Value of gift	Gift duty payable	Value of gift	Gift duty payable
£	£	£	£
500 ..	Nil	10,000 ..	1,800
1,000 ..	50	15,000 ..	3,450
2,000 ..	140	20,000 ..	5,200
3,000 ..	270	25,000 ..	6,750
4,000 ..	440	30,000 ..	8,400
5,000 ..	650	40,000 ..	12,000
6,000 ..	840	Over 40,000, 30 per	
7,000 ..	1,050	cent of value of	
8,000 ..	1,280	gift	
9,000 ..	1,530		

Normally any gifts made by a farmer will be to his family or a trust, company, or combination of both which has been established for their benefit. To make a real impression on the size of his estate the farmer will probably have to sell his land to the company or trust and then proceed to gift the debt owing to him over a period of years.

A very simple example could be: If a farmer's dutiable estate is £35,000, he may decide to sell his land to a family trust or company and to gift the debt back at £1,500 per year. Assuming the land is valued at £20,000, his estate can be reduced to £15,000 in 13 to 14 years for a cost of approximately £1,200 in gift duties. At the same time the theoretical saving in estate duty would be £9,750, that is, the difference between £12,000 estate duty on £35,000 and £2,250 estate duty on £15,000. Thus the net saving when the gift duty has been subtracted could be approximately £8,500.

This may sound startling to those who have not previously investigated these matters. Many other factors would need careful checking if a basic plan of this nature were under consideration. The example gives only a few salient points of a very complicated and important transaction and has been quoted merely to draw attention to the important possibilities of estate planning in relation to estate and gift duties.

Only farmers with fairly large estates may find it worth while establishing trusts or companies, but this should not prevent smaller owners from making sure that everything possible has been done to provide for estate duties.

Probably few farmers do not carry life insurance and this must be one of the most common methods of providing for at least a portion of the estate duties. It has the advantage of supplying ready cash when it is most needed, and insurance premiums up to £250 a year are exempt from income tax.

However, investment in increased insurance, while tending to reduce the estate through payment of premiums, will produce, as with other forms of investment, an asset on which duty will have to be paid. This may not be important and in no way decries the obvious usefulness of insurance, but it should not be forgotten when estimating the amount of duty that will have to be found.

Prepayment of Estate Duties

Prepayment of estate duties is a comparatively new provision in the Estate and Gift Duties Amendment Act 1960, under which it is now possible to make payments of £10 or multiples of £10 into an estate duty prepayment account. On the death of the payer these amounts are not included in the dutiable estate and are credited against the estate duty due.

There are a number of conditions governing prepayment of estate duties, but normally payments are not recoverable. However, if prepayments exceed the estate duty due, the excess is added to the estate and if after the duty has been recalculated there is still a remainder, this will be refunded.

Where there is sufficient cash available prepayment certainly gives another way of retaining or even reducing the level of an estate and at the same time setting aside money to help pay the eventual estate duty. The pros and cons of this against other methods of providing for estate duty should be given careful study.

Specialist Advice Required

No common plan can be given to farmers regarding provisions for the eventual duties on their estates. Each farm must be dealt with on its own merits. This article merely attempts to alert farmers to the importance of keeping a constant check on their affairs. If it is felt that improvements can be made or if the economic status of the farm or family has changed, prompt attention should be given. Few farmers have up-to-date legal or accountancy training, and advice should be obtained from specialists if maximum safety for the estate is to be ensured.

Acknowledgment

The author acknowledges the help given by the Commissioner of Inland Revenue in the preparation of this article.

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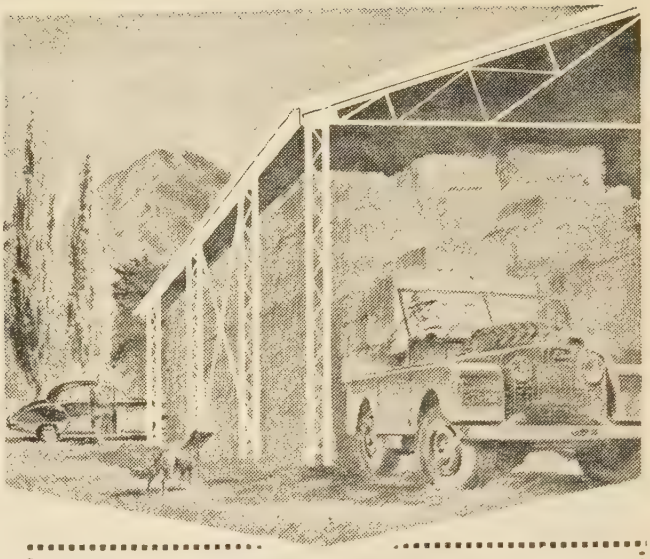

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Sources of Water on the Farm

By J. O. BRASELL,
Farm Machinery Instructor, Department of Agriculture, Palmerston North

THERE is a wide variety of possible sources of water for irrigation and other purposes on farms. Though town supply may be available to some farms, it is seldom satisfactory for irrigation, as demands for this purpose could embarrass the water supply engineer unless sprinkling is done at night or only a small draw-off is acceptable. The water is generally metered and the charge at Palmerston North, for example, is 1s. 3d. per 1,000 gallons. This is not cheap for irrigation, especially as supply may be restricted when necessity is greatest.

ALTERNATIVE supplies should always be investigated. They could be from pond, stream, or deep or shallow ground water. In some places all are available. At Palmerston North, for instance, there are the Manawatu River, underground water which will flow from 230 ft to above ground level without assistance, and shallow water at 15 to 30 ft in free river shingle.

Contrary to a common belief the spread of which may be attributed to some diviners, ground water does not move in streams except in rare conditions, as in tunnels in limestone. The earth's crust acts as a sponge and the water within moves as a sheet through cracks and inter-spaces toward some surface outlet. Most often it moves only a few feet a day and most of the movement occurs near the water table. Any rock on subsurface material which transmits water is known as an aquifer.

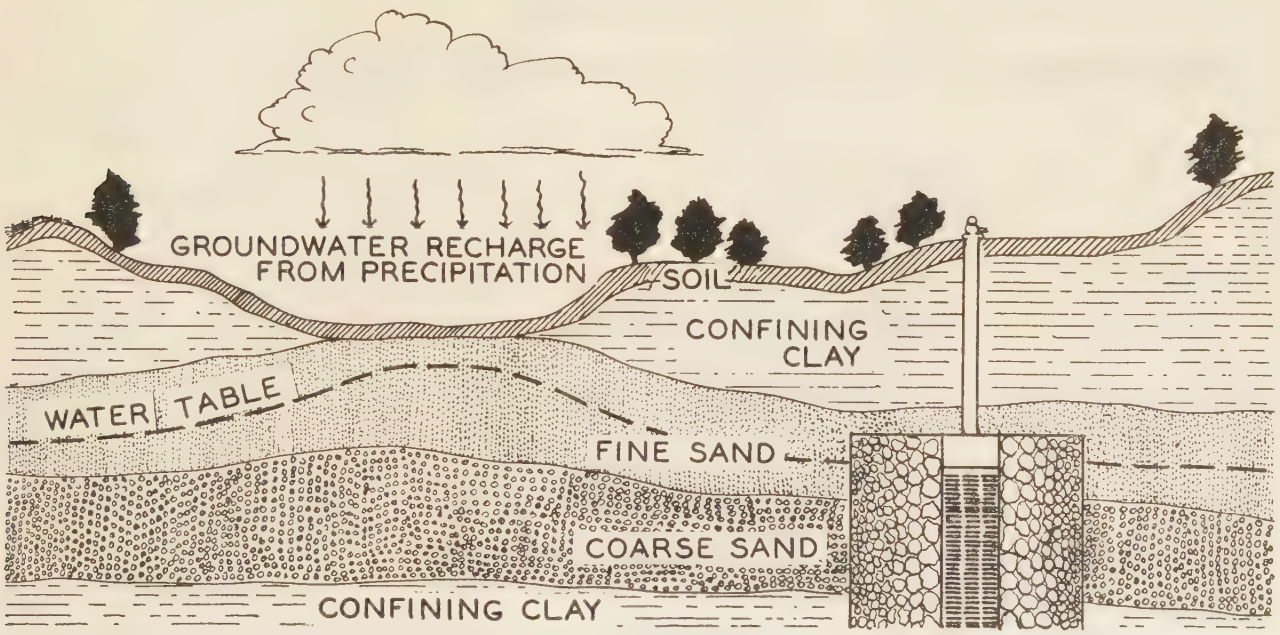
Sands and gravels containing little clay make good aquifers and will soak up a large amount of water. Clay country is a poor aquifer, as most of the rain goes off in surface run-off. Most hard rocks transmit water only through cracks and crevices. The permeability, thickness, and extent of the aquifer govern the amount of water available.

Substrata Categories

Permeability is largely governed, apart from particle size, by the degree of cementation and compaction of the material. Thus as far as easily available water supplies are concerned, the substrata can be divided into three broad categories, loose, compacted, and hard.

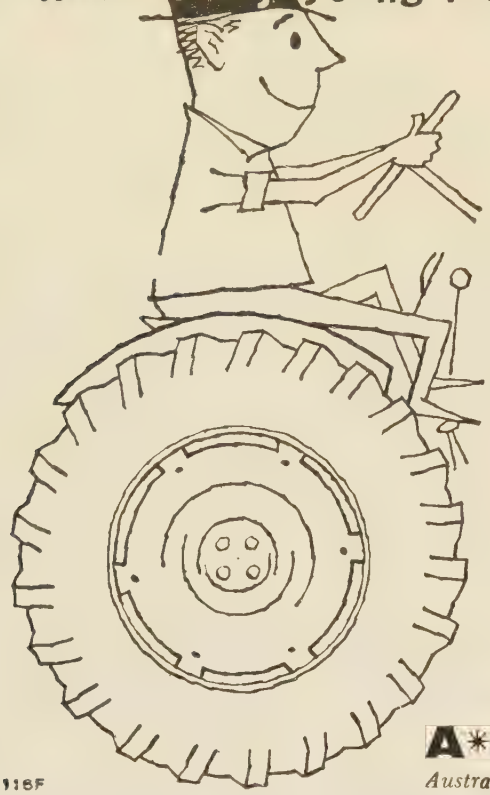
Loose material includes many of the alluviums deposited in river valleys, coastal plains, or as dunes or recent volcanic deposits. In sand country or land built up by river action large quantities of free water will often be found from ground level to 30 ft, which is within the range of surface pumps, and this could and should be the cheapest water available.

Compacted material: Sandstone, limestone, mudstone (papa), etc., which are sometimes folded and faulted, may yield some water, but such compacted material would seldom produce enough for irrigation.



Typical section through water-bearing country with a well being recharged by rainwater from the point where sand meets the topsoil. The enlarged inset shows how reversing the direction of flow of the water during development of the bore has resulted in coarse particles becoming packed about the filter. In this operation both the fine and coarse particles are agitated and the fines are drawn off through the well bore.

What every young farmer should know...



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Types of Wells

Any hole in the ground dug or drilled for water may be referred to as a well. There are three main types:

1. A well liner sunk in sand and fine shingle. This should be avoided in heavy stone.
2. The dug well. Well digging is a specialised and dangerous job.
3. The drilled well. This is costly, but if the driller is experienced and knowledgable, it is generally the most satisfactory.

Well Liner

In fine sands the liner will generally fail, as the sand will flow with the water, and though the liner may be placed with, say, 4 ft of water in the base, in a short time it will be found that the sand has flowed until a depth of 9 to 15 in. remains. In-flow of water is then reduced and ingress of sand into the pump becomes a real problem. Screening could well be the answer. Well point screens could sometimes be used. The common form of these is a heavy, pointed pipe drilled at the lower end, with gauze spaced out from the sides. A ball valve is placed in the point and water is pumped down through the pipe. This jets out of the base, displacing the ball and the sand, etc., ahead of the screen, which is gradually lowered into position.

These screens were originally developed for removing water from sites for foundations, etc. A series of these screens may have to be used to reduce the velocity of water at and around the gauze so that the sand is not recompacted. Another type of screen, the large shingle or sand screen, allows more exact development of the well. This screen relies on a reasonable depth of the water-bearing layer, and the deeper the screen is placed within the aquifer the greater will be the quantity of water obtained, depending on the fineness of the sand.

In principle, the screen is lowered through a well casing to the depth of the coarsest layer within the aquifer. The casing is withdrawn to the top of the screen and a lead packer seals the two off. The well is then surged (water is pumped from the well at high volume, the pumping ceases, and water is returned). The aim is to stir up the sand surrounding the screen and pump out up to 40 per cent of the fines, leaving only coarse sand around the screen. The greater the area of coarse sand remaining the easier will be the flow of water to the screen.

In land built up by a river, especially where the river flows reasonably fast, the proportion of fines in the deposit will be low and water in large quantities is available for pumping. Here, a series of well liners could be sunk by digging out from under the edges of the liners and allowing the liners to settle into the cleared space. As each section gets to ground level a further section is placed on top, and the accumulated weight assists in overcoming wall friction on the way down. Slotted or drilled well casing of suitable size could be put into place by a boring rig. The slots must have a larger diameter inside than out, so that any particle that passes into the slot or hole cannot be jammed, but will pass right through.

Drilled Wells

With drill rigs aquifers can be tapped down to many hundreds of feet. It is often cheaper and more satisfactory to drill deep than to pump from great distances.

Prices for well drilling vary from district to district and with distance of operations from headquarters. In the Palmerston North district costs quoted are as follows:

In.	Per foot	For casing shoe
	£ s. d.	£ s. d.
2	1 0 0	1 0 0
2½	1 8 0	3 10 0
3	1 12 6	4 0 0
4	2 10 0	6 0 0
6	4 10 0	8 0 0

Milage is payable one way for a well over 20 miles from Palmerston North.

It is apparent, then, that all possibilities of locating and drawing on a water supply should be investigated before any one system is adopted.

Shallow Ground Water

Water from tidal streams or shallow wells in coastal areas should be tested for salt content to ensure suitability of quality.

Permanently installed galvanised iron pipes should not be used if much iron is present in the water, as the iron will precipitate and cause sludging and encrusting of the pipes that will reduce flows, and sometimes block pipes.

Seepage Traps

Costly extension of a system to provide water to a distant paddock can often be avoided if a seepage or small spring can be found, though these are not always a reliable source. Many of the year-round green patches on an otherwise dry hillside can provide good, clear emergency water and occasionally total water supply for a field or farm.

A total supply for a Dannevirke dairy farm has been produced from a large seepage system. Originally the area was a constant swamp in a small gully head. Little water ever seemed to flow. A cut was made around the gully head into the subsoil below. Three feet of blue pug or waterlogged clay was found to be overlying a coarse, immature material which was loosely packed and fairly pervious.

A line of 4 in. field tiles was laid on a grade of one in 100, the last three tiles on a steeper grade being bell-mouthed glazed pipes. A concrete plug was cast in the last opening and a section of galvanised pipe placed in it.

This pipe flowed into a 3,000 gallon reservoir on which the farm supply scheme is based. The trap supplies 4,000 gallons per day. Care should be taken to see the pipes are laid well into the pervious layer **and then well covered in.**

"Land, Food and Water": H. Addison

THIS book gives brief details of a large number of irrigation projects in Africa, Europe, Asia, India, America, and Australia, and gives some account of the not inconsiderable areas of the world where water deficits might be of importance in food production. For those interested in irrigation and the increased production which might be achieved the title seems somewhat misleading. Little is given of the type of production or the extent by which food units are increased with the use of water for the schemes mentioned. It is obviously not meant to be a book on detail and for those wishing to learn about irrigation it is not recommended. It could not be recommended either for those seeking some statistics on world food supplies, as there is little information of this nature.

Very sketchy details are given of land reclamation schemes such as the TVA. It is pointed out, however, that water control schemes cover a wide range and that they can no longer be regarded solely as a means of augmenting food supplies. As the author says, they should rather be looked on as potential instruments for building up the general level of civilisation. Food in itself may hardly be more than a by-product of the system.

In the final chapters dealing with the contra-account of irrigation production, the more speculative irrigation developments, the conversion of salt to fresh water, and the storage of food supplies, we find a number of interesting and arresting statements. The book is enjoyable, but in no ways a text book of agriculture

—W.R.L.

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New Varieties of Hops Tolerant to Black Root Rot (*Phytophthora* Spp.)

BECAUSE of the prevalence of black root rot, caused by the soil fungus *Phytophthora cactorum*, a programme was begun in 1952-53 to breed new commercial varieties of hops tolerant to black root rot disease. Three seedlings have now passed disease-resistance and quality tests. Propagation material of two of these was released to growers in spring 1960 under the names First Choice and Calicross. Planting material for a third seedling will be available to growers in spring 1961 under the name Smooth Cone. These are the first hop varieties to be bred in New Zealand.

ALL hops in New Zealand are grown in Nelson Province, 700 acres being under commercial cultivation. The principal variety grown was obtained from the Pacific Coast of America about 1900 and is known as Californian. It is probably identical with Late Cluster, the main variety grown on the Pacific Coast at present.

In New Zealand the Californian variety almost completely replaced the English Fuggle and Golding varieties which were previously grown, as it considerably outyields these in the Nelson climate. They are maintained only in places where Californian can not be grown because of its susceptibility to black root rot, a disease which has spread very rapidly throughout many hop gardens during the last 20 to 30 years. The varieties Fuggle and Bumford (an English Golding variety) are tolerant to the disease.

Black root rot is prevalent on soils with a high water table. About 30 per cent of the area under hops is affected. The percentage of replants on these soils, varying between 20 and 40 per cent in a season, is dependent mainly on the rainfall during April to October, when the plants are dormant.

The damage is observed in early spring, when hop gardens are ploughed off and the hills are opened for pruning. The crowns of infected hills then appear dry and dead and parts of the storage roots show a black discolouration of the cortex and lose water under slight pressure. In severe cases crown and storage roots have completely decayed. On rare occasions, black root rot causes the collapse of the hills during the later part of the growing season. Replants in their first year yield on an average about 75 per cent only of the crop of an established hill, so that black root rot generally causes a considerable reduction in yield when many plants are infected and have to be replaced.

Breeding of New Varieties

A programme was begun in the 1952-53 season to breed new commercial varieties of hops tolerant to black root rot disease.

In hops, the male and female organs are on separate plants. Therefore tolerant male plants had to be found to be crossed with female varieties of good agronomic qualities or tolerant female varieties had to be used in the initial crosses. The tolerant varieties Fuggle and Bumford produce low yields in the Nelson climate and the quality of their hops is not acceptable to New Zealand brewers, whereas the Californian variety is favoured by both growers and brewers. Therefore it

By R. H. J. ROBORGH,
Hop Research Station,
Department of Scientific and
Industrial Research, Riwaka

was decided to use this variety as the female parent, the crosses to be made with a range of males which, because of their survival in commercial gardens on highly infected soils, were considered to be tolerant to the disease.

From 1953 onward a large number of seedlings were raised from crosses of Californian female x tolerant male, from first back crosses to Californian, from intercrosses of F_1 plants, and from uncontrolled crosses of Californian female. These seedlings were grown in gardens interplanted in the ratio of 1 : 6, with hills of Californian as controls.

Female seedlings showing promising agronomic features in their first year were harvested individually, and their hops dried, weighed, and sampled for determination of brewing value. During the following dormant season they were tested in the laboratory for tolerance to black root rot. Seedlings which showed a higher tolerance than the Californian variety in these susceptibility tests were harvested individually in the next season and, provided yield and brewing value were again satisfactory, were propagated by layering.

Two years after propagation was begun sufficient material was available to plant selected seedlings in variety trials for comparison with Californian. Seedlings which were not inferior in yield to this variety, produced hops of high quality and were tolerant to black root rot, were approved for release to hop growers.

Three seedlings have passed these tests. Propagation material of two of these was released to growers in spring 1960 under the names First Choice and Calicross. Planting material of a third seedling will be available to growers in spring 1961 under the name Smooth Cone.

Tolerance to Black Root Rot

The tolerance of First Choice, Calicross, and Smooth Cone to black root rot is considerably higher than that of Californian, as shown by the following results:

1. Susceptibility Tests

Cuttings from the base of the bine of the new varieties were grown alongside those of the susceptible Californian and the tolerant Fuggle varieties in highly infected soil at temperatures and moisture conditions favourable for the fungus.

Two to three weeks after the tests started cuttings of the new varieties appeared to be as healthy as cuttings of Fuggle, whereas those of Californian were severely infected by the fungus, showing intense discolouration of the cortex. Four to five weeks after the trial started cuttings of Fuggle and of the new varieties also showed symptoms of black root rot.

2. Survival of Seedlings in Seedling Garden

Six years after the seedlings from which the new varieties have been developed were planted in the seedling garden at the Hop Research Station they are still healthy, whereas 77 per cent of the interplanted hills of Californian have died from black root rot.

3. Survival of Seedlings in Variety Trial Plots

In a variety trial at the Hop Research Station all hills of each of the varieties First Choice, Calicross, and Smooth Cone are still healthy three years after planting, whereas 53 per cent of the interplanted hills of Californian have died from black root rot infection.

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DESCRIPTION OF THE NEW VARIETIES OF HOPS

FIRST CHOICE

Parentage: This seedling was raised from seed from a hill of the Californian variety (top right), the male parent being unknown.

Botanical characters: **Bine** fine, yellowish green, faintly striped. **Laterals** long, developing from top half of bine. Adult **leaves** of medium size, 5 to 7 lobed, characteristically greyish green. **Cones** more or less densely clustered, of medium size, yellowish green, firm, ovate, tip inclined to be open. **Strig** thin. **Lupulin content** high.

CALICROSS

Parentage: This seedling was raised from seed from a hill of the Californian variety (top right), the male parent being a hill of the Fuggle variety.

Botanical characters: **Bine** coarse, olive green, faintly striped. **Laterals** long, developing from top half of bine. Adult **leaves** large, 5 lobed, dark green. **Cones** single, large, green, medium firm, ovate, and gradually tapering to a point. **Strig** thick. **Lupulin content** average.

SMOOTH CONE

Parentage: This seedling was raised from seed from a hill of the Californian variety (top right), the male parent being unknown.

Botanical characters: **Bine** fine, olive green, red striped. **Laterals** long, developing from top two thirds of bine. Adult **leaves** medium small, 3-5 lobed, green. **Cones** single, medium large, pale green, very firm, long oblong, pointed, often slightly crescent-shaped, lightly furrowed longitudinally. **Strig** medium thick. **Lupulin content** high.

FOR USE AFTER ASSISTED LAMBING TO PREVENT BLOOD-POISONING AND BLACKLEG IN SHEEP.

FOR FOOTROT IN DAIRY COWS, CATTLE AND PIGS.

FOR ARTHRITIS IN LAMBS AND PIGS.

PROCAL

Pronounced PRO-KAL

hypodermic penicillin

For intramuscular injection!

Three Strengths

'100' (Lambs) Arthritis, etc.
'500' (Ewes) At Lambing, etc.
'1500' (Cattle & Pigs) Footrot, etc.

In flat tins with hypodermic needle

MANNINGS *HAMILTON*
VETERINARY LABORATORIES

THE GREAT EWE SAVER AT LAMBING TIME —

PROCAL

(pronounced **Pro-kal**)

Blackleg in sheep, more commonly referred to as blood poisoning, usually results from infection of wounds, such as occur at shearing, dipping, lamb marking, docking or in ewes while lambing. This is understandable when it is realised that the blackleg germs are frequently found in the wool and on the skin of normal sheep and in the soil and pastures.

Prevent Ewe Losses at Lambing Time

Blackleg losses in ewes associated with lambing are prevalent during the lambing season, and ewes assisted at lambing almost invariably die unless an intramuscular injection of Procal (pronounced Pro-kal) Hypodermic Penicillin 500 is given immediately after each operation. A further injection after 24 hours—as a preventive measure—should follow. At lambing most cases are due to infection from shepherds' hands; an immediate injection of Procal will kill the bacteria before it can attack.

Navel Ill or Arthritis in Lambs

Navel Ill or Arthritis is a bacterial infection causing an inflammation of a joint and sometimes death. These bacteria enter the body either through the undried navel cord soon after birth or through wounds, such as occur at castration, docking and ear-marking. They then reach the joints via the bloodstream. Affected lambs are lame on one or more legs, or may show a general stiffness, a few days to a week or more after marking, and death may occur quite quickly.

Treatment and Prevention with Procal

Navel Ill and Arthritis frequently causes death unless treated with Procal. A preventive injection of Procal immediately after each operation will attack the bacteria in the bloodstream. For small lambs, inject one tube of Procal 100; and repeat as necessary. In acute cases, a tube of the stronger strength—Procal 500—is advisable.

Footrot in Cattle, Dairy Cows and Pigs

Many cases of footrot respond dramatically to Procal Penicillin. An injection of one or two tubes of '1500' strength with a repeat in 24 hours is recommended.

Procal is a laboratory proved formula of Procaine Penicillin and Crystal Penicillin. This combination provides the properties of the quick - acting crystal ingredient with the longer, more durable suspension of Procaine Penicillin.

Yield

A trial to compare the yields of the three new varieties and Californian was carried out in two consecutive seasons at the Hop Research Station. The trial was planted in three randomised plots of four hills for each of the new varieties; adjacent to each plot of a new variety was a plot of four hills of Californian. The results are shown in Table 1 (the figure for Californian is the mean yield of the nine replicates).

TABLE 1—YIELDS OF HOP VARIETIES
(Green hops, lb per hill)

Season	First Choice	Calicross	Smooth Cone	Californian
1957-58 ..	7.25	7.17	4.84	5.06
1958-59 ..	12.28	10.31	13.27	14.96

In the 1957-58 season the yield of First Choice and Calicross was significantly greater than that of Smooth Cone and Californian, which did not differ significantly in yield.

In the 1958-59 season the new varieties were lower in yield than Californian, both First Choice and Calicross being significantly so. It is probable that the lower yields of the new varieties, relative to Californian in this season, were due to their having been pruned abnormally severely in spring 1958 to obtain the maximum amount of planting material for increase.

After more propagation material had been obtained another trial on a larger scale was planted in 1959 to compare the yields of the three seedlings and Californian. A plot consisted of 39 hills each planted with two layer cuttings. The trial was laid down in two replications.

Hop yields were obtained in 1960 and are shown in Table 2 as bushels per acre and lb per acre of kiln-dried hops. Alpha resin yields per acre have been calculated from the mean contents of the varieties over three years.

TABLE 2—YIELDS OF HOP VARIETIES

Variety	Green hops (bushels per acre)	Dry hops (lb per acre)	Dry hops (lb per bushel)	Alpha resin (lb per acre)
First Choice ..	1,308	1,505	1.15	126
Calicross ..	1,716	1,824	1.06	120
Smooth Cone	1,300	1,482	1.14	127
Californian ..	1,687	1,618	0.96	89

The yield of green hops per acre from First Choice and Smooth Cone is lower than that from Calicross and Californian, but First Choice and Smooth Cone yield a greater weight of dry hops per bushel of green hops than Calicross and Californian. All three seedlings are considerably superior to Californian in yield of alpha resin content.

Brewing Value

Alpha resin content and aroma are the two principal characters of hops which determine the value of a new variety for the brewer. Alpha resin content is determined by international standard methods, but aroma is largely a question of preference and national taste. Alpha resin content therefore has been the main criterion in testing seedlings for brewing value, and a seedling tolerant to black root rot and of good agronomic characters has been rejected on aroma only when this was distinctly unpleasant.

1. Alpha Resin Content

The Alpha resin contents of the three new varieties compared with that of Californian are shown below:

TABLE 3—ALPHA RESIN CONTENTS
(Per cent of dry weight)

	1955-56	1956-57	1957-58	Average
First Choice ..	8.8	7.5	8.9	8.4
Calicross ..	5.8	7.3	6.6	6.6
Smooth Cone ..	7.2	9.0	9.6	8.6
Californian ..	5.4	7.2	5.0	5.9

Calicross is similar in alpha resin content to Californian, but First Choice and Smooth Cone are distinctly superior.

2. Aroma

New Zealand brewers have commented very favourably on the aroma of the new varieties. The aromas of Smooth Cone and First Choice have been described respectively as "outstanding" and "pleasant—mild". Calicross was third, but its aroma was not considered inferior to that of Californian.

Arthur Guinness Son & Co. Ltd. (Dublin) described the aromas of First Choice and Smooth Cone as "very pleasant" and "pleasant" respectively; they considered Calicross to have an aroma very similar to that of Californian.

Freedom-from-Hunger Campaign

Firewood is so short in parts of many countries of Asia, the Near East, Africa, and Latin America that dung is diverted from its use as fertiliser to be burnt.

Waste lands and neglected woodlots are numerous round many villages and near farms. Too often they are used only for destructive grazing or haphazard extraction of fuel. Good planning of their use could provide firing, shade for animals, and protection from drying and eroding winds.

Through FAO the Freedom-from-Hunger campaign is working to help increase fuel supplies and to see that available wood is used more effectively. An increase can be achieved by creating plantations of fast-growing species, irrigated where practicable.

Training courses for women are an essential part of the plan, as the satisfactory introduction of wood-burning stoves is greatly influenced by the attitude of housewives and their knowledge of how to use the stoves, as well as by the types of cooking utensils available.

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Distributors: R. S. ELLIOT & CO. LTD. P.O. Box 5358, Auckland.

Economical Water-chilling Unit for Cooling of Milk

By G. R. INSULL,
Farm Dairy Instructor, Department of Agriculture, New Plymouth

ADEQUATE cooling of milk at farm dairies is essential. A system which has been tried and proved successful in an area where good water supplies are difficult to obtain in sufficient quantities at low temperature is described in this article.

EFFICIENT cooling is one of the most important factors in supplying good-quality milk for both manufacturing and town supply. Tanker collection of milk has further emphasised this need, as the milk is held in bulk and very often the evening's and morning's milk are mixed. Much of the milk is collected late in the morning and, unless it is properly cooled, it can deteriorate rapidly.

To control bacterial development, milk must be cooled to 65 degrees F immediately after milking. Under normal conditions with a cooler of sufficient size in relation to the number of cups in use three times the volume of water to milk is required.

In some areas it has been difficult to obtain adequate water supplies for cooling, and ways of conserving available water as well as efficiently cooling milk have concerned farmers.

Two North Taranaki dairy farmers on tanker collection, worried by the high temperatures of their cooling water and the possibility of shortage during drought, installed water-chilling units in their dairies.

Half the area beneath their milk-stands was constructed as a water reservoir with a capacity of 600 gallons, and a copper coil connected to a small refrigerating unit was set in the bottom of this tank.

Cooling Procedure

The cooling procedure is as follows. The chilled water is drawn from the bottom of the reservoir, pumped through the tubes of the cooler, and returned to the chilling tank over a spreading tray 9 in. wide x 2 in. deep and 9 ft long fitted at water level. This tray prevents agitation and keeps the warmer returned water at the top of the reservoir, thus avoiding raising the temperature of the whole of the chilled water supply.

The following temperature checks on 10 and 11 January 1961 indicate the efficiency of the system. In shed A the pre-cooling section was used on a 21-bar cooler, but in shed B an ordinary 9-bar was found efficient.

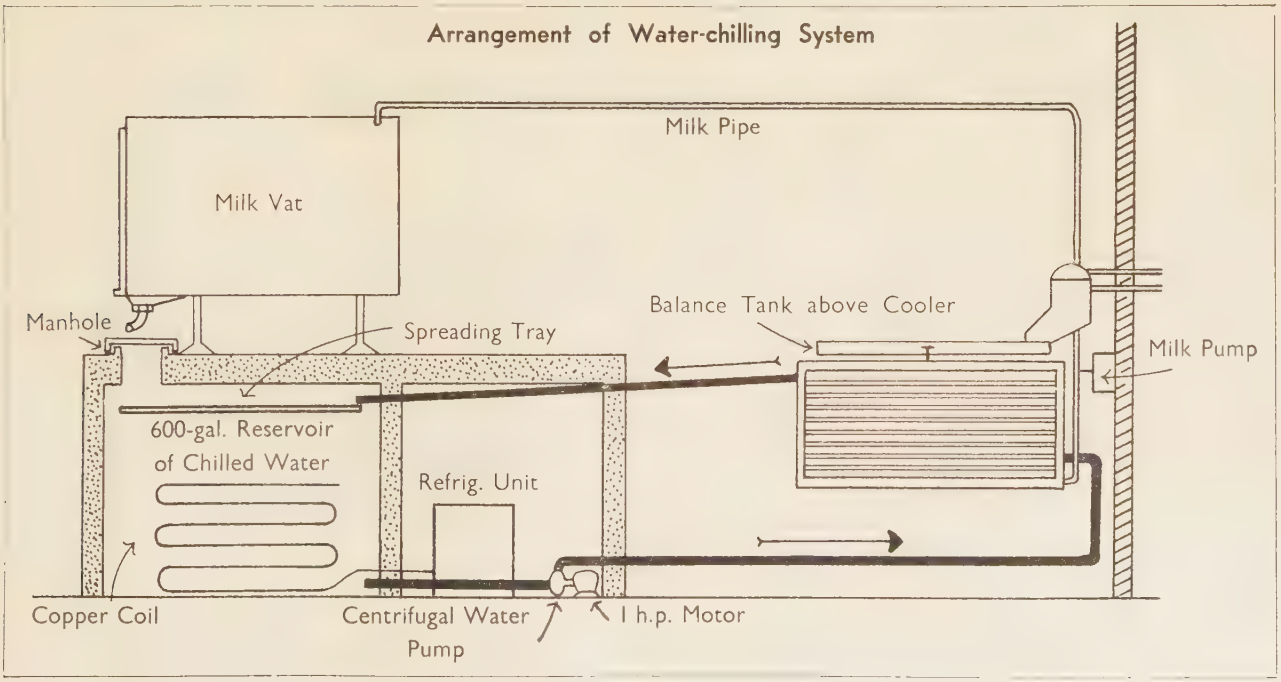
	Shed A	Shed B
Type of shed ..	Herringbone	Walk-through
No. cows milked ..	110	82
Size of plant ..	8-cow	8-cow (4 D.U.)
Size of cooler ..	21-bar	9-bar
Air temperature ..	74 degrees F	70 degrees F
Pre-cooling water temperatures		
Entering ..	64 degrees F	
Leaving ..	79 degrees F	
Gallons per hour	60	
Chilled water temperatures		
Entering ..	48 degrees F	46 degrees F
Leaving ..	52 degrees F	48 degrees F
Gallons per hour	260	250
Milk temperatures		
From releaser ..	94 degrees F	94 degrees F
Bottom of pre-cooling section	74 degrees F	
Bottom of chilled section ..	50 degrees F	47 degrees F
Entering vat ..	50 to 53 degrees F	48 degrees F
Temperature in vat	53 degrees F	48 degrees F
Temperatures taken next morning		
Air temperature	63 degrees F	63 degrees F
Temperature milk in vat ..	55 degrees F	52 degrees F
Gallons of milk	215	150
Time taken to milk	1½ h	1½ h

A rise of 1 degree in temperature was noted in the chilled water entering the cooler toward the end of milking.

Thermostatic Control

The units are thermostatically controlled and the desired milk temperature can be obtained by a simple adjustment on the refrigerator unit. The same water can be used indefinitely provided good, clean water (preferably rainwater) is used initially,

Arrangement of Water-chilling System



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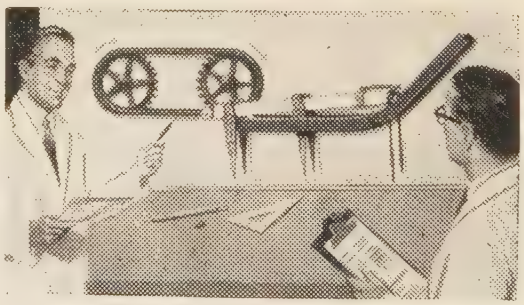
For free information write: Doring Implement Distributors, P.O. Box 1179, Wellington C.1., New Zealand.



Exclusive FLOW-ACTION handles hay gently - saves nutrient-rich leaves.

NH NEW HOLLAND *"First in Grassland Farming"*

WATER-CHILLING UNIT . . .

as it does not come in contact with any contaminating influences if the system is properly installed.

The cost of installation is well within the means of the average farmer and the only maintenance necessary appears to be the topping up of the tank because of evaporation or seepage.

As another means of maintaining quality, this system of cooling and water conservation should appeal to those farmers experiencing water shortages, and as a result of observations over the present year this system can be recommended as one of the most economical and efficient innovations of its type.

Crops Insure Against Facial Eczema

RESPONSIBILITY for prevention of a serious attack of facial eczema still lies with the farmer, and the best possible insurance against it is the growing of crops on which to graze animals when recommendations to restrict pasture grazing are made by Facial Eczema Committees.

To produce a facial eczema insurance crop cultivation should begin early (in August or September) to ensure that all pasture plants and seedlings are killed during working. Hasty and late preparation can lead to plentiful regrowth of existing plants and new seedlings. Headlands should be well cleaned out right up to the fence lines, as they can be a fruitful source of infection if well littered edges and corners are available for grazing.

Crops should be chosen which will give a dense, weed-smothering cover and which are likely to sustain the greatest number of stock on the smallest area for the longest time.

For fertile and flats areas or even lightly rolling country green feed maize ideally fulfils these conditions. Sow in 14 in. drills at 40 lb per acre in October or November. Maize likes heat and requires a high soil temperature. For steeper areas use chou moellier broadcast at 3 lb per acre on the more fertile soils, but substitute thousand-headed kale on drier or poorer soils.

Turnips are excellent and are particularly useful when spring and early summer are too wet for cultivation. New Zealand York Globe can be ready to feed in from eight to 10 weeks and can be broadcast at 1 lb per acre on well consolidated ground. All brassica crops should be sown with 3 cwt of reverted superphosphate.

—H. de O. Chamberlain,
Farm Advisory Officer,
Department of Agriculture,
Gisborne

Radio Broadcasts to Farmers

RADIO broadcasts for farmers will be given in September as follows:

1XH Hamilton, 12.33 p.m.

11 September—"Flavours in Milk and Cream", by M. J. McFetridge, Supervisor of Farm Dairy Instruction, Department of Agriculture, Hamilton.

18 September—"Pasture Spraying for Bloat", by M. G. Boyer, Farm Advisory Officer, Department of Agriculture, Hamilton.

25 September—"Hygiene on the Farm", by G. W. Carter, Livestock Instructor, Department of Agriculture, Hamilton.

1YZ Rotorua, 7.15 p.m.

13 September—"Flavours in Milk and Cream", by M. J. McFetridge, Supervisor, Farm Dairy Instruction, Department of Agriculture, Hamilton.

27 September—"New Developments in Fruit Farming", by B. M. Piper, Horticultural Instructor, Department of Agriculture, Tauranga.

2XA Wanganui, 8 p.m.

7 September—"For the Country Women", by Mary Macdonald.

14 September—"Farming News".

21 September—"Treatment of Pigs to Prevent After-weaning Losses", by E. M. Bailey, Supervisor, Taranaki District Pig Council.

28 September—"Poultry Notes", by B. J. Russell, Poultry Instructor, Department of Agriculture, Wanganui.

2XB Masterton, 6.45 p.m.

8 September—"Seed Crops", by W. B. H. Smith, Fields Instructor, Department of Agriculture, Masterton.

29 September—"Crops for Next Winter", by R. Thompson, Supervisor, Wellington District Pig Council, Masterton.

2XG Gisborne, 8 p.m.

5 September—"Farm Improvement", discussion by H. de O. Chamberlain, Farm Advisory Officer, Department of Agriculture, Gisborne, and D. Briant.

12 September—"For the Orchardist", by J. Overbye, Horticultural Instructor, Department of Agriculture, Gisborne.

19 September—"Action Now Takes Care of Pigs during Coming Winter", by S. W. Rees, Supervisor, Bay of Plenty District Pig Council.

26 September—"Message to Maize Growers", by G. J. Graham, Technician, Department of Agriculture, Gisborne.

2XP New Plymouth, 8 p.m.

7 September—"News and Views from the Farm Advisory Division", by G. R. Moss, Farm Advisory Officer, Department of Agriculture, New Plymouth. Peter Weenink's Y.F.C. Session.

21 September—"Your Sheep and Wool Instructor Reports", by P. C. Marshall, Sheep and Wool Instructor, Department of Agriculture, Wanganui.

28 September—"Radio Vet.", by J. H. Macdonald, Veterinarian, Department of Agriculture, New Plymouth.

2YZ Napier, 7.10 p.m.

5 September—"Sheep and Wool", by H. R. Lusk, Sheep and Wool Instructor, Department of Agriculture, Hastings.

19 September—"Soil Conservation", by S. T. Anaru, Farm Advisory Officer (Soil Conservation), Department of Agriculture, Hastings.

3YA Christchurch, 12.20 p.m.

4 September—"Management of Growing Stock", by E. G. Wills, Poultry Instructor, Department of Agriculture, Christchurch.

4YA Dunedin and 4YZ Invercargill, 12.36 p.m.

4 September—"Improved Egg Production by a Controlled Environment", by J. H. Jones, Poultry Instructor, Department of Agriculture, Oamaru.

11 September—"Irrigation Research in Central Otago", by G. G. Cossens, Research Officer, Department of Agriculture, Alexandra.

18 September—"Improvement of Tussock Grasslands by Other Means than Topdressing", by R. V. Maxwell, Soil Conservator, Department of Agriculture, Kurow.

25 September—"Care of Lambs", by I. W. Bayne, Livestock Instructor, Department of Agriculture, Wanaka.

Regular Sessions

1YA Auckland, Mondays at 12.36 p.m. ("Country Journal", including "Report from Ruakura"), Tuesdays, Wednesdays, Thursdays, and Fridays at 12.33 p.m. ("Country Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

1XN Whangarei, Mondays at 8 p.m. ("Northland Stock Market Report", followed by "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 12.33 p.m. ("Farm News").

1XH Hamilton, Mondays at 12.36 p.m. ("For the Farmer", excluding first Monday in month and public holidays), Wednesdays at 12.33 p.m. ("Report from Ruakura").

1YZ Rotorua, Wednesdays at 7 p.m. ("Bay of Plenty Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

2YZ Napier, Tuesdays at 7.10 p.m. ("The Hawke's Bay Farmer"), and Thursdays at 12.33 p.m. ("News for the Farmer").

2XG Gisborne, Tuesdays at 8 p.m. ("Farm Session").

2XP New Plymouth, Thursdays at 8 p.m. ("Farm Session").

2XA Wanganui, Mondays at 8 p.m. ("For the Man on the Land"), Tuesdays at 8 p.m. ("Farm Supplement"), and Thursdays at 8 p.m. ("Farm Topics").

2XB Masterton, Wednesdays at 6.45 p.m. ("Masterton Stock Market Report"), Fridays at 6.45 p.m. ("Farm Session").

2XN Nelson, Thursdays at 8 p.m. ("Nelson Farm Topics").

2ZA Palmerston North, Mondays at 12.36 p.m. ("Country Digest"), and Fridays at 8.30 p.m. ("Country Digest", including Feilding stock market report).

2YA Wellington, Mondays, Tuesdays, and Fridays at 7.10 p.m. ("Farm Session"), Thursdays at 12.33 p.m. ("News for the Farmer").

3YA Christchurch, Mondays at 12.20 p.m. ("Country Session"), Thursdays at 12.33 p.m. ("News for the Farmer"), and 7.10 p.m. ("Home Paddock").

3XC Timaru, Wednesdays at 8 p.m. ("Farmers' Weekly News Service"), and Saturdays at 10.30 a.m. ("Country Mailbag").

3YZ Greymouth, Mondays at 12.36 p.m. Thursdays at 12.33 p.m. ("News for the Farmer").

4YA Dunedin, Mondays at 12.36 p.m., Tuesdays at 12.33 p.m., Wednesdays and Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.36 p.m., Wednesdays and Thursdays at 12.33 p.m. ("News for the Farmer").

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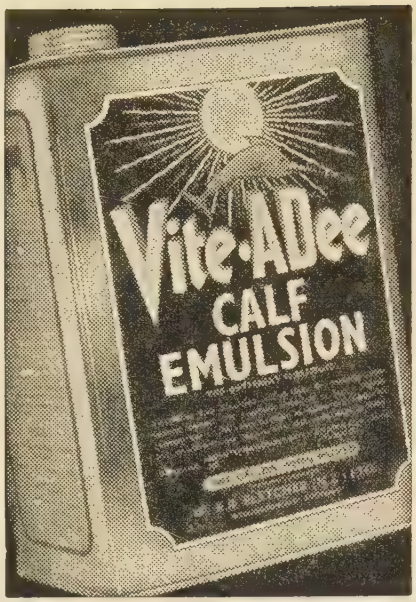

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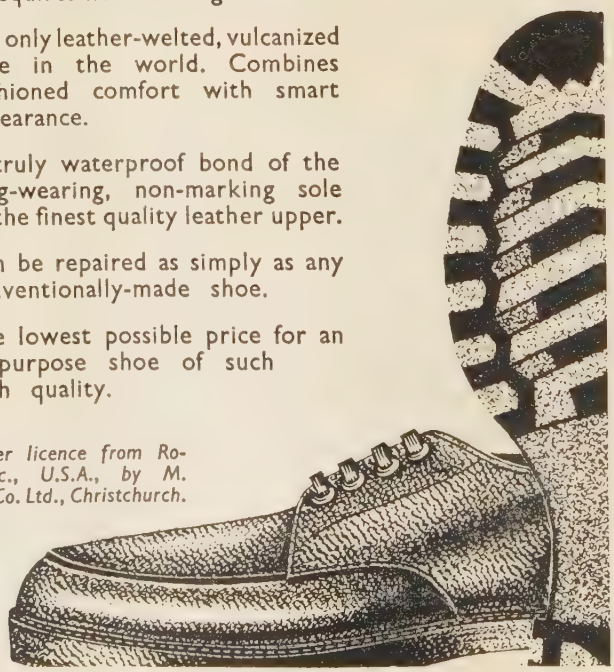

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Town Supply Herds Certified Clear of Reactors to Tuberculin Test

DURING May the following town milk suppliers were issued by the Department of Agriculture with clear herd certificates declaring that their herds are free of reactors to a tuberculin test.

To qualify for a clear herd certificate a supplier's herd must have no reactors to a tuberculin test of the whole herd. A herd comprises all cattle over six months of age depastured or kept on one property and includes dry or other stock from the property temporarily on a run-off. Where two or more herds share a common run-off all the herds using it have to be tested before any of them can qualify for clear herd certification.

In the list below the figures after each supplier's name and address are the number of the animals tested and these are followed by the date of the test.

These herds will be recorded in the New Zealand Register of Clear Herds, compiled by the Department of Agriculture.

ABERCROMBIE, H., 577 Hills Rd., Christchurch, 25, 24/4/61
ADAMS, E. J., Coatesville, 3 R.D., Albany, 4, 19/5/61
ALGIE, S. W., Henley, No. 1 R.D., Outram, 65, 24/4/61
ALLAN, C. J., Frankton, No. 1 R.D., Cromwell, 90, 24/4/61
ALLAN, J. D., Cloverdale, No. 1 R.D., Queenstown, 77, 24/4/61
ALLEN, T. A., Awamate R.D., Wairoa, 72, 9/5/61
ALLEYNE, A. F., Hanmer, 5, 21/5/61
AMYES, A. C., Greenstreet, No. 1 R.D., Ashburton, 46, 28/4/61
ANDERSON, R. J., Rimu No. 5 R.D., Invercargill, 22, 19/5/61
ANDREWS FARM HOLDINGS, Kaitoke, 134, 1/5/61
APPLEBY, C. F., Bluff Hill Rd., Runciman, 93, 9/5/61
BAIGENT, C. H., Mountain Rd., Lepperton, 63, 1/5/61
BAIN, J. M., Henley, No. 1 R.D., Outram, 144, 17/4/61
BAIN, T. A. R., Awaiti R.D., Paeroa, 86, 6/5/61
BAKER, A. C., Massey R.D., Henderson, 37, 16/5/61
BAMPTON, W. S.,138 Marihau Rd., Christchurch, 35, 24/4/61
BELL, J. A. H., (No. 3 Herd), P.O. Box 425, Hamilton, 137, 11/5/61
BELL, N. J., Puhinui Rd., Papatoetoe, 46, 23/5/61
BENTLEY, H. E., Lansdowne Rd., Halswell, 8, 7/4/61
BERRYMEN, J., Springfield, R.D., 38, 15/5/61
BIDDICK, S. P., Charles Rd., No. 1 R.D., Papakura, 78, 29/5/61
BOOTH, R. E., R.D. 1, Hamilton, 132, 5/5/61
BRADBURY, A. F., P.O. Box 5, Te Horo, 54, 1/5/61
BRATLIE, J. M., Parish Line Rd., Clevedon, 94, 14/4/61
BRIANT, D. W., Patutahi, Gisborne, 40, 30/5/61
BRISTON, M., Ohoka, Kaiapoi, R.D., 81, 9/5/61
BROWN, C. G., Matawhero, Gisborne, 62, 8/5/61
BROWN, M. McV., Judgeford, Pauatahanui, 27, 9/5/61
BROWN, R. E., P.O. Box 13, Ngaruawahia, 89, 4/5/61
BRYANT, W. L. and C., P.O. Box 29, Manakau, 206, 23/5/61
BUCHANAN, A. L., Longbush, No.1 R.D., Invercargill, 39, 19/5/61
BUICK, D. J., R.D. 5, Palmerston North, 112, 2/5/61
BYERS, T., Jesmond Rd., Drury, 36, 18/4/61
CALVERT, E., Oteramika Rd., 48, 5/5/61
CAMERON, A. M., Ladbrooks, 2 R.D., Christchurch, 27, 12/5/61
CARMICHAEL, C. G., Bethlehem, R.D. 2, Tauranga, 208, 30/5/61
CARRYER, W., Douglas Rd., Stratford, 77, 24/4/61
CASELEY, W. E., Makirikiri Valley, Wanganui, 70, 16/5/61
CHARMLEY BROS., Freelands Rd., Kiritaki, Dannevirke, 243, 2/5/61
CHILCOTT, N. H., 108 Smart Rd., New Plymouth, 52, 9/5/61
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COAKLEY, J. A., 98 Sabys Rd., Halswell, Christchurch, 62, 18/5/61
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CONNOLLY, P. I., Beach Rd., Te Horo, 39, 2/5/61
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CRYER, A. J., Cryer's Rd., East Tamaki, 161, 1/5/61
CURRIE, J. V., Orowaiti, Westport, 28, 23/3/61
DALLEY, P., No. 5 R.D., Palmerston North, 70, 13/3/61
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TAYLOR, W. R., Box 85, Otaki Railway, 99, 22/5/61
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WOODWARD, A., Utopia Rd., Westport, 52, 21/3/61
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HAYCOCK, C. A. J., Station Rd., Ohakune, 62, 27/2/61

Inspection of Carcasses for Tenuicollis (False Hydatids)

DURING slaughter of animals on the farm for home meat supplies or dog tucker, it is most important to inspect carcasses very thoroughly for tenuicollis (false hydatids), according to the National Hydatids Council.

Tenuicollis (*Taenia hydatigena*), though not as serious as the true hydatid tapeworm, *Echinococcus granulosus*, which causes hydatids in humans as well as stock losses, is responsible for most of the cysts which lead to the condemnation of lamb livers on slaughter.

In their early stage the cysts caused by *E. granulosus* and *T. hydatigena* in animal livers are similar, and livers are likely to be condemned without the specific tapeworm being identified. Control of hydatids must therefore embrace the elimination of both *E. granulosus* and *T. hydatigena.*

Treatment or disposal of the offal does not necessarily ensure that all hydatids cysts are destroyed. ◀ As this photograph shows, some tenuicollis cysts may remain attached to the interior of the abdominal cavity. It is most important to remove them immediately. If they are left, they may infect dogs fed parts of the carcass.

Thorough search for tenuicollis should include the skirting and hindquarters and throughout the abdominal cavity before the carcass is moved or cut up for dog tucker.

The Council recommends that during slaughter dogs should be tied up well away from the killing shed and that a four gallon drum or similar container be placed directly under the carcass to catch any cysts that drop off as the offal is being taken out and put into the drum. The floor should be washed after slaughtering as a further precaution.

Pruning Shrubs

[Sparrow

▲ A mixed shrub border which blends perfectly with the surrounding bush. Regular pruning maintains the vigour and beauty of the individual trees and shrubs.

SYSTEMATIC pruning keeps a shrub or tree shapely, vigorous, and flowering well. The more that is known about the flowering habits of such a plant the more effective will be the pruning, but new shrubs may be an "unknown quantity", and this article is a guide to pruning the shrubs and trees commonly grown in New Zealand gardens.

By JOY WATKINS,
Horticultural Advisory Officer,
Department of Agriculture,
Auckland

A SHRUB which is never pruned, but with plenty of room to develop, sheltered from prevailing winds, and given the best possible position, soil, and climate may become a good specimen; for example a "breath of heaven" in a small section or a large rhododendron in a park or domain.

More often, though, an unpruned shrub is also neglected in other ways. It becomes stunted, straggling, and windblown, with fewer and smaller flowers. The branches are bare except at the tips and much of the decorative value of the shrub is lost. Hard pruning at this stage may rejuvenate the plant, or it may kill it.

Tools

A sharp pruning knife, with a hone to **keep** it sharp, is excellent, but many amateurs do not have the opportunities to become expert with the pruning knife. Most home gardeners prefer to use secateurs; either parrot beak or roll cut type are suitable if they are sharp. They should be sharpened or repaired each year, blades, springs, etc., being replaceable in some models.

For pruning large limbs a pruning saw which has a curved blade is admirable. The tip is tapered so that it can go between two closely adjoining branches of a fork without damaging other branches. Double-edged saws are more difficult to manipulate in closely branched trees and shrubs.

When a branch is sawn off the cut surface should be pared smooth with a knife to facilitate callusing (healing), and then painted with a bituminous paint to protect it from disease. Any cuts larger than ½ in. in diameter should be treated this way. With roses and similar small shrubs a fungicidal spray immediately after pruning is a good precaution against infection.

Pruning Newly Planted Shrubs

Shrubs which have been grown in pots or other containers suffer very little root disturbance if they are carefully planted, and they will not require pruning at this stage.

Those which have been lifted from the open ground will have lost a proportion of roots, and this must be balanced by cutting back the top growth; otherwise the depleted root system will be unable to supply the original amount of branches with water and minerals with the result that the shoots will die back from the tips. Some gardeners allow this to happen, and prune back to new growth as soon as it has been made from healthy buds. Others are fearful that disease will enter the dead tips, so they prefer to cut back the branches as soon as the shrub is planted. The amount of cutting back varies with the type of shrub (some can stand much harder pruning than others) and with the amount of root lost in transplanting.

Evergreens are normally wrenched at least six weeks before they are moved, and if this has been well done and the root system properly balled, there is the minimum of root disturbance on transplanting. Do not remove more than a quarter of the length of main branches. A well grown, well wrenched, and properly balled evergreen should need very little pruning if replanted at the right time of the year (late autumn or early spring) during cool, showery weather.

Deciduous trees and shrubs, particularly large ones, normally need more heavy pruning at planting, the main branches being cut back half way or even more to healthy dormant buds. This stimulates the strong growth of new branches which will form the framework of the young bush. Care should be taken to prune each branch to a bud pointing outward in the direction in which it is desired that a new leading branch should grow.

As hard cutting back is injurious to some trees and shrubs, small young specimens are more easily moved without much disturbance of the root system. These will form new roots and grow rapidly, whereas an older, larger specimen may suffer a severe shock and stop growing for a year or two. (Azaleas, rhododendrons, and michelias are exceptions, as large specimens can be moved quite safely).

When pruning newly planted or established shrubs thin out crowded stems and remove one of any two branches which cross and rub each other; also any thin, weak ones. Dead or diseased branches can easily infect healthy parts of a shrub and should be cut back well into healthy wood as soon as noticed. Burning all affected

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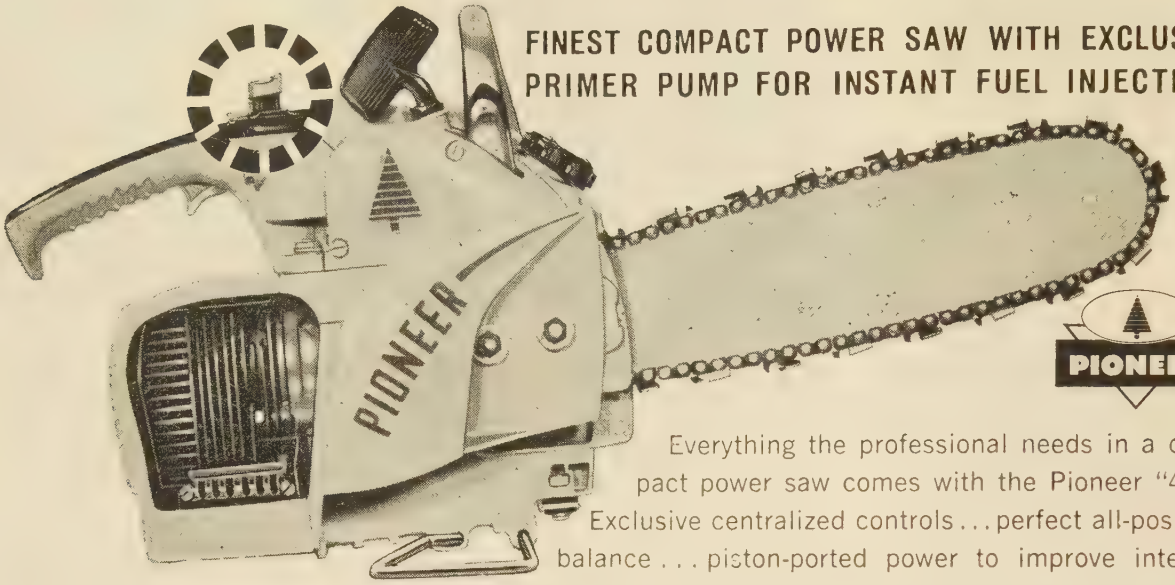

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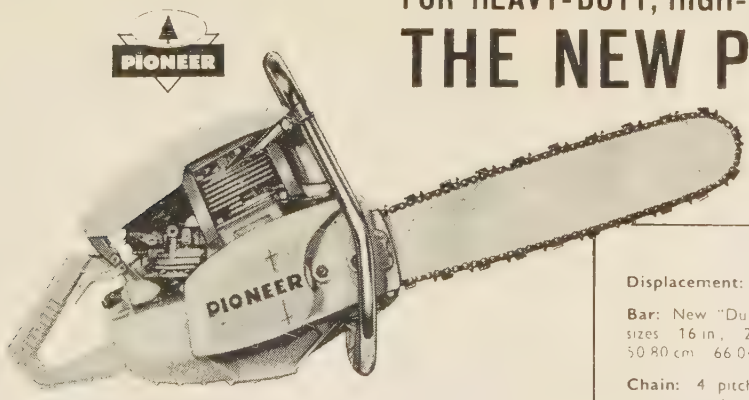

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prunings will destroy any disease, and is preferable to composting in this case.

Shaping

Each shrub or tree has a characteristic shape under good growing conditions with adequate spacing. Frequently, because of uneven lighting or exposure to wind, a shrub will grow more on one side than the other. Occasionally the leading shoot is damaged and several laterals grow vigorously to replace it, needing to be reduced to one. Sometimes one branch will grow more vigorously than the rest, and unless it is pruned it will dominate the growth, making the shrub lopsided.

Shaping does **not** mean clipping the shrub with shears to any desired pattern as though it were a hedge or topiary plant. This method is possible with small, fine-leaved shrubs like diosma and erica, but it will cause considerable damage and possibly some die-back of large-leaved evergreen shrubs. These should be treated individually, over-vigorous branches being pruned back to a sound outward-pointing bud or lateral well down among the main mass of the bush. Any branches which are obviously unwanted can be cut right out or pinched back at the tip when young and soft.

When to Prune

Shrubs which drop their leaves and become dormant during winter are normally pruned then. If they flower during winter or early spring, they should be pruned immediately after flowering.

Shrubs which are frost tender or evergreen are mostly pruned in early spring, as soon as growth commences. The extra growth left on during winter will help to prevent cold or frost damage which can result in the dying back or death of a shrub.

Shrubs and trees which flower on one-year-old wood (for example, peach, almond, rambler rose, acacia, and cytisus) are pruned immediately after flowering, so that the plant has the maximum time to grow new flowering shoots.

Pruning Established Trees and Shrubs

1. Trees and shrubs which flower on two-year-old or older wood, so that any pruning is likely to reduce the amount of flower.

Hard pruning a vigorously growing shrub is likely to increase the amount of young growth, which will not flower for at least two years. Disappointment often results when vigorous young shrubs of this group are consistently pruned and given too high a proportion of nitrogenous manures. A light dressing of sulphate of potash, about 1 oz to the square yard, and no pruning for two or three years will often produce the desired results. Most trees and shrubs which flower on old wood require the minimum of pruning. Remove dead, dying, and weak branches and thin out crowded branches. Occasionally cut out any very old stems. Shape the bush as necessary. Trees and any shrubs whose pruning requirements are not known should be treated in this way, also the following:

Azalea, camellia, deutzia, forsythia, kerria, kowhai, kolkwitzia, lilac, loropetaum, malus, magnolia, oleander, philadelphus, pieris, rhododendron, sarcococca, skimmia, some spiraeas, stachyurus, viburnum, and weigela (diervilla).

PRUNING SHRUBS IN FLOWER GARDEN

Shaping a bush. Cut as shown to balance the shape of the bush.

2. Shrubs which flower on the tips of young growths, but which cannot stand hard pruning.

In many cases it is fatal to cut back into wood which is bare of leaves. Pruning consists of trimming the shrub to shape and of removing faded flowers so that vigour is not wasted in the production of unwanted seeds. Prune immediately after flowering. Cutting flowers for house decoration is often sufficient without any further pruning. The majority of Australian and South African shrubs are treated in this way. These and others are:

Adenandra, *Agonis juniperina*, backhousia, baeckia, banksia, bauera, barklya, cantua, calluna, calythrix, callistemon, chamaelaucium, clianthus, coleonema, daphne, diosma, dryandra, epacris, embothrium, erica, eriostemon, eucryphia, felicia, hakea, *Hibiscus syriacus*, hovea, hypocalymma, isopogon, jovellana, kunzia, lambertia, leptospermum, leucospermum, lhotskya, melaleuca, myrtus, phylica, podalyria, pomaderris, protea, selago, telopea, templetonia, thryptomene, and tibouchina.

3. Shrubs which flower on one-year-old wood, and are able to stand harder pruning which will rejuvenate the bush each year.

Prune immediately after flowering, cutting back all stems which flowered to within a few buds of the base. These buds will grow out to form shoots which will flower a year later. Examples of this group of shrubs are:

Acacia, albizzia, cytisus, lavender, *Olearia gunniana*, pachystegia, *Pimelia ferruginea*, senecio, and tamarix.

Minimum pruning of shrubs, as described in the text at left. Remove dead, weak, and crowded branches.

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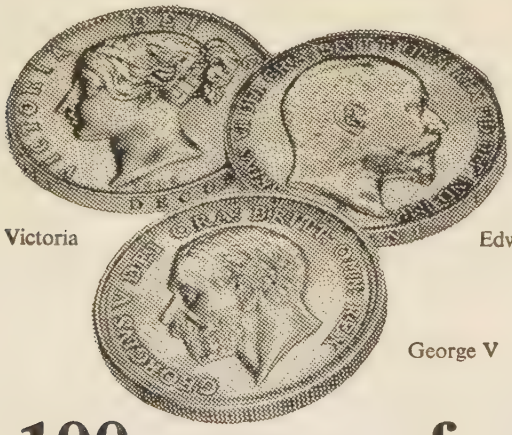

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Boronia and prostanthera (Australian mint bush) are also in this group, but should not be pruned quite so hard. Cut away about half the length of growth made the previous season.

4. Shrubs which flower on current season's growth are pruned hard before the season commences, so that there is the maximum growth of new shoots which will flower within a few months.

Cut back stems which flowered last season to within a few buds of the base.

The following shrubs should be pruned during winter. They are mostly hardy, though some are frost tender but vigorous:

Ceanothus 'Gloire de Versailles', caryopteris, buddleia (except *B. colvillei* and *B. alternifolia*), datura, erythrina, eupatorium, *Hibiscus mutabilis*, hypericum, lantana (must be pruned before new growth starts), lagerstroemia, leonotis, lespedeza, lippia, lonicera, luculia, malvaviscus, poinsettia, romneya, *Solanum phyllyreiodes*, swainsonia, sutherlandia, and tecoma.

Some shrubs require lighter pruning. the length removed being only half the previous season's growth during winter; for example, heliotrope, hydrangea, jacobinia (which must be pruned before new growth starts).

5. Shrubs, like those listed under (4), which flower on current season's wood, but are frost tender or evergreen, are not pruned until growth commences in early spring.

Examples are beloperone, bouvardia (also pinch growing tips), crotalaria, *Clerodendron ugandense*, diplacus, euryops, fuchsia, iochroma, moschosma, myoporum, plectranthus, and santolina (twice a year).

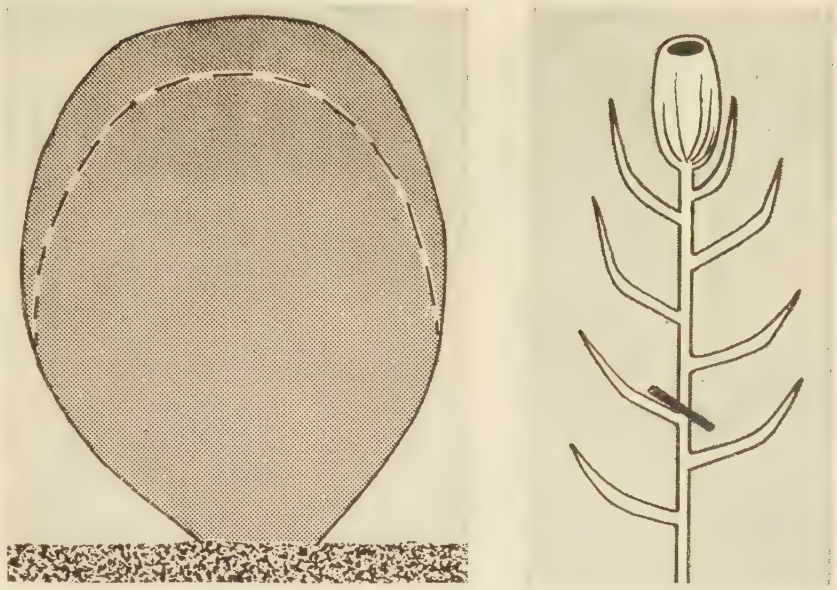
Some need lighter pruning, only half the length of previous season's growth being removed in early spring; for example:

Cassia corymbosa, ceratostigma, *Hibiscus rosa-sinensis*, and hibiscus hybrids.

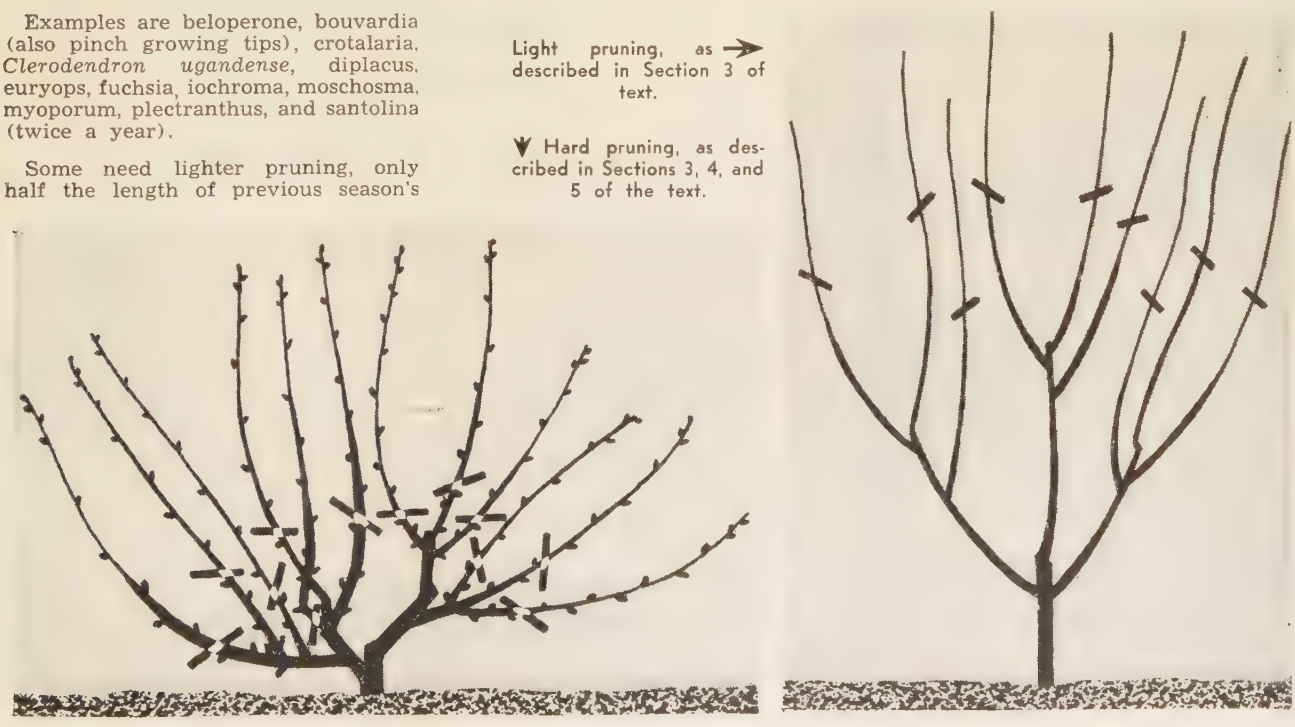
Climbing plants are pruned in the same way as other shrubs, except that more growth is retained to furnish the wall or trellis on which it is growing.

Many which flower on old wood need little pruning beyond thinning, removing very old and worn-out stems, and trimming to shape; for example, *Clematis montana, C. armandii, C. indivisa, Cotoneaster horizontalis, Trachelospermum jasminoides.*

Those which flower in winter and early spring on one-year-old wood are



Pruning as described in Section 2 on page 183. Left: The broken line shows approximately the extent to which shrubs such as coleonema and manuka should be trimmed after flowering. Right: Remove dead flower heads of proteas, lilacs, rhododendrons, and waratahs, etc., cutting back to well developed heads.



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pruned hard after flowering; for example, *Pyrostegia venusta* and *Jasminum polyanthum.*

Those which flower later in the season are pruned in the winter if hardy, or early spring if frost tender, new growth being cut back fairly hard; for example, *Solanum wendlandii*, campsis, podranea, *Clematis jackmani*, and large-flowering hybrids, bignonia, *Cobaea scandens*, and plumbago.

Prune wistaria in the winter, cutting back stems made the previous season to within three or four buds of the base, as most of the flowers are produced from these buds. An alternative method which is preferable is to spur back all new growth not required for extension to about two or three buds as soon as 1 yd of growth is made in summer. Repeat as necessary during summer. No winter pruning is then needed.

Treatment of Old and Neglected Trees and Shrubs

Shrubs which have been neglected for many years, particularly if they are overcrowded in a shrub border, need somewhat different treatment. Due to overcrowding and neglect there will be a considerable amount of dead wood present, and frequently the shrub is bare of leaves and flowers except at the top, and is thoroughly misshapen. Before attempting to give individual treatment to such shrubs, it is advisable to consider whether any of them should be removed completely to allow the others more space for healthy natural development.

Retain those which are still growing and flowering reasonably well. Trees and those shrubs which are slow to develop should not be removed unnecessarily, as they are difficult to replace within ten or more years of new planting. Old specimens which can be saved will need careful pruning to remove dead wood and to improve the shape. Little more is possible with those which resent hard pruning.

When a shrub has not been pruned for many years it is unlikely to respond well to normal pruning. Cutting back into bare wood is likely to kill it. Shrubs of this type, listed under (2), should be removed and replaced, if there is room, with young specimens after thorough cultivation of the soil. It is better not to plant the same species in the same place again.

Fortunately many trees and shrubs can be rejuvenated by cutting them back hard to within a few feet of the ground in winter or early spring. These include many in group (1), which normally receive the minimum of pruning, and gradually become straggling and less attractive. Before giving such a drastic treatment, make sure that the tree or shrub is likely to respond. Examples are as follows:

Acmena, callicarpa, *Camellia sasanqua*, and japonica (**not** *C. reticulata*), deutzia, dipelta, eriostemon, eucalyptus, euonymus, *Hibiscus syriacus* (cut back to a few feet), hoheria, hydrangea, idesia, kowhai, laburnum, leucothoe, lilac, magnolia (in early spring), mahonia, malus, melia, metrosideros (pohutukawa), michelia, myrtus (to 2 to 3 ft high), nandina, *Nerium oleander*, olearia, osmanthus, philadelphus, pistacea, plumeria (frangipani), pseudopanax, punica, schinus, senecio, spiraea, staphylea, tilia, tristanea, viburnum, weigela, westringa, and zelkova.

New growth should be thinned out and carefully trained and pruned. Growth is normally vigorous, as there is a large established root system. Weeding and manuring may also be necessary.

Conifers and Pine Trees

Conifers and pine trees must not be cut back when they grow too tall. Cutting the main stem or branches of mature trees back to an arbitrary height and width is likely to kill them. If a conifer is to be planted in a restricted position, choose one which will not grow too tall and keep the side branches trimmed back each year. Single specimens or shelter belts which become too large for the position they occupy should be removed and replaced.

Garden Work in September

Though the air temperature rises quickly as the days get longer, the soil is much slower to warm up, and root growth is still rather slow. This poor root action is reflected in the lack of growth of shoots and yellowness of leaves, particularly of tender and subtropical

SOWING

Frost tender annuals to flower in summer and hardy annuals to flower in autumn may be sown now. A small raised bed in a sheltered position is ideal for raising seedlings. Draw out shallow drills about 6 in. apart and sow the seed thinly, as thinning disturbs the seedlings, and a thick stand is more likely to develop damping off and other diseases. If the seed is very fine, mix with dry sand or soil to aid in sowing thinly. Cover seeds with their own depth of soil.

Where the soil remains cold and wet and in the colder parts of the country sowings may be made under glass either in glasshouses or frames and the seedlings planted out as soon as conditions are suitable.

Sow statice, salvia, zinnia, cleome, petunias, celosia, french and african marigolds, kochia, and browallia; also delphiniums and seeds of all types of bulbs.

PLANT

Frost tender plants such as:

Canna, calla, dahlia, begonia, tuberose (remove all side growths from tuberose bulbs before planting; otherwise they are unlikely to flower). These can all be started under glass in the colder districts. Frost tender and evergreen shrubs and climbers (for example, fuchsia, hibiscus, protea, South African and Australian shrubs) may be planted in sunny, sheltered positions. Also plant corms of gladioli, including the miniature types, and flowering bulbs.

LIFT AND DIVIDE

Primroses, polyanthus and other primulas, and bletilla orchids.

Choose a well drained bed, and add leaf mould, bush mould, peat, or other organic matter to increase the water-holding capacity of the soil. Primulas and violets can be grown in semi-shaded positions, though they will flower more during winter if they are in a sunny spot. Commercial growers use north-facing slopes for this purpose, but they irrigate frequently during the hot, summer months, and spray regularly to prevent infestations of red spider mite. The violets are propagated from runners taken in September and inserted 6 in. x 12 to 18 in. apart in their flowering positions. Both primulas and violets are improved by the addition of a mixture of 4 parts of blood and bone, 1 part of superphosphate, and 1 part of sulphate of potash worked into the soil at 4 oz to the square yard before planting. Proprietary brands of balanced fertiliser mixtures are equally good.

Lift and divide gerbera and other herbaceous plants and replant in fresh ground if possible.

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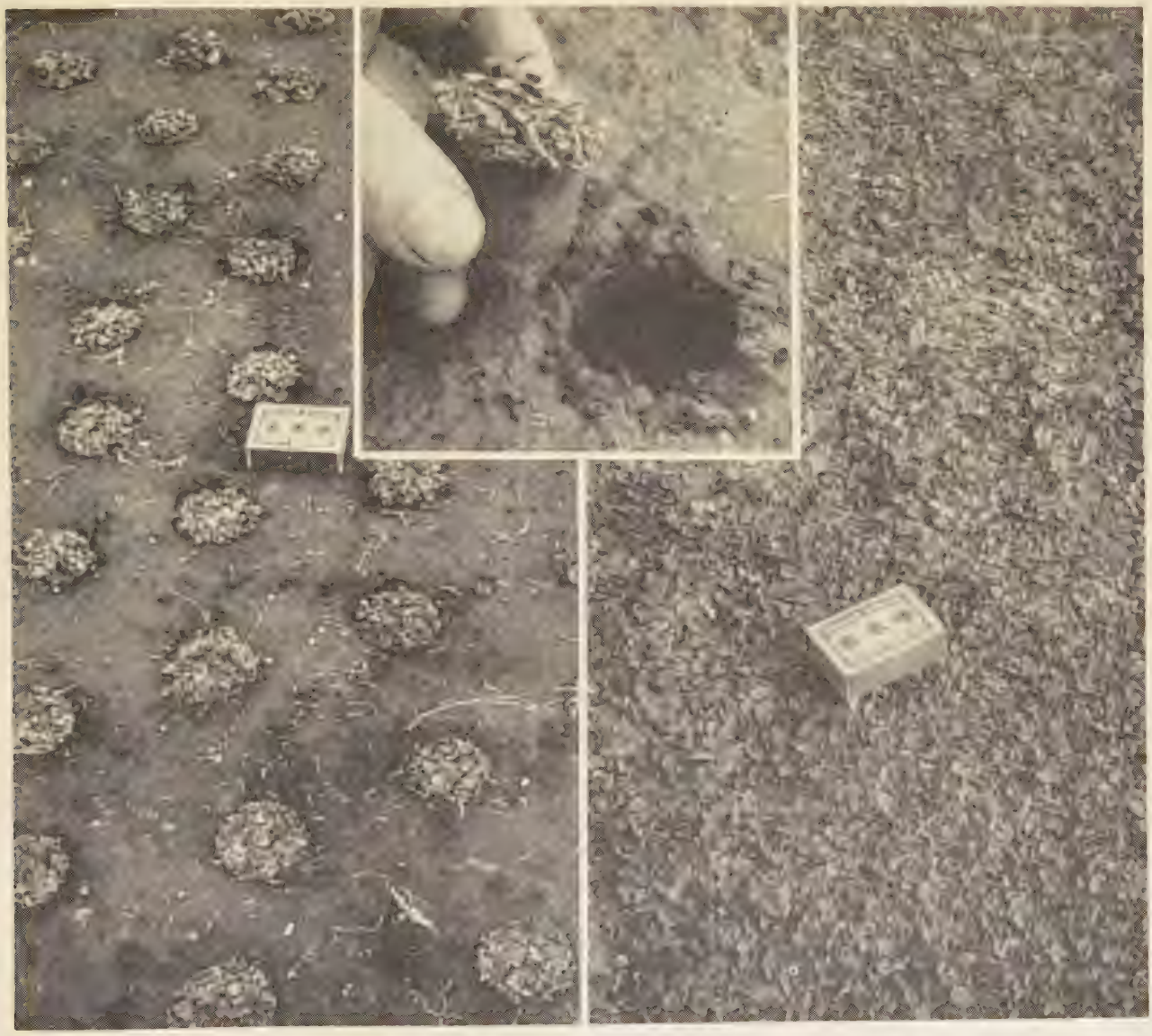
plants, which need a higher temperature for growth than plants from colder climates. Nothing is gained by planting or sowing when the soil is wet and cold. Germination of seeds and growth of the roots of newly planted shrubs and herbaceous and bedding plants will be much more satisfactory when the soil is warmer, drier, and in a good friable (crumbly) condition.

Lawns

Spring sowing of the traditional fine leaved lawn grasses is not generally recommended in New Zealand, as the hot, dry weather of two or three months later is too severe for the young seedling grasses, which have developed only shallow root systems by then. Autumn sowing (about March) is preferable for sowing browntop, bent, and Chewings fescue.

In the warmer northern parts of New Zealand the subtropical grass *Paspalum dilatatum* makes a reasonably good turf which remains green through the hottest summers. It needs a higher temperature for germination than the other grasses, so it should not be sown until the end of October or November, when the ground has become warm. The seeds will rot if sown earlier. Preparation of the ground should begin this month with thorough cultivation to a depth of at least 6 in. and preferably 9 to 12 in. It is rarely necessary in home gardens to bring in topsoil for lawns if the existing soil can be well cultivated and manured before sowing. If topsoil is added to level up a site or where subsoil has been completely exposed, it is advisable to break up the subsoil with a fork or rotary cultivator first. Topsoil should always be carefully inspected before purchase, as it is a common source of such weeds as oxalis, twitch, and kikuyu.

After the first deep cultivation and levelling further surface cultivations will be necessary as fresh batches of weed seeds germinate. This method



Sparrow

A newly planted area of Mercury Bay weed, left, and a portion of a well established Mercury Bay weed lawn, right. Inset is a plug of Mercury Bay weed and a planting hole.

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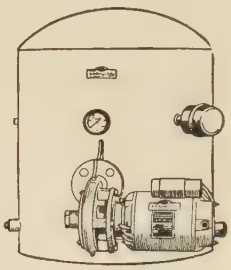

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of weed eradication is much easier than hand weeding the seedling lawn, and avoids smothering or disturbance of the grasses. Fertiliser should be worked into the topsoil about two weeks before sowing, a mixture of equal parts of sulphate of ammonia and superphosphate being used at 1 oz to the square yard.

If a "weed" lawn is to be sown or planted, the soil preparation is the same, though weeding is even more important than for grass lawns. Plants which form effective green "lawns" but need little or no mowing are usually planted in spring.

Mercury Bay weed (*Dichondra repens*) may be sown or plugs may be planted in frost free areas from October to January. Planting distance of the plugs varies according to the time and money which can be spent in establishing a lawn. At 4 in. x 4 in., 80 plugs are needed to each square yard, but the area is completely covered in two months. At 8 in. x 8 in. only 20 plugs are needed, but complete coverage will take considerably longer, **and in the meantime it is essential to keep the ground free of weeds.**

Mow when necessary to keep the lawn close and even. Manure with 1 oz to the square yard of a mixture of 3 parts of sulphate of ammonia to 1 part of superphosphate every three months, watering it in to avoid scorching the leaves.

Plugs of Mercury Bay weed may be inserted 12 in. x 12 in. in existing fine grass lawns in spring. The weed will spread through the grass during summer and keep the lawn green in the hottest weather, but the lawn will still require regular mowing.

A pleasant close green covering where mowing is difficult or undesirable can be obtained with *Lippia canescens*. This can be grown in any part of the country and plugs of it are available from a few plant retailers.

Existing lawns should be rolled, particularly if the surface has lifted at all with frosts. Small hollows are most easily filled by adding sandy, weed free, sifted soil to the surface and levelling off with the straight edge of a board. The grass quickly grows through thin coverings of this sort.

If the lawn had many dead, brown patches in it last summer, it is likely that it is infested with grass grub. This can be controlled with 50 per cent DDT, which is normally mixed with a routine fertiliser topdressing so that it can be spread at the rate of 1 oz to 40 sq. yd., and then watered in.

Many old lawns can also be improved by raking to remove dead leaves and allow the young grass shoots to grow freely. A mixture of the hormone weedkillers MCP at 1 fl. oz. and 2,4,5-T at 2 fl. oz. to 100 sq. yd. may be used now and in autumn to control broad-leaved weeds. Extreme care must be taken when using such weedkillers, as they can severely damage many garden plants.

Pests and Diseases

Pests and diseases become more active as the weather improves. Slugs and snails can do a lot of damage to seedlings and newly developing shoots, so the ground round these should be watered with a proprietary brand of liquid metaldehyde, or slug bait should be placed in the vicinity.

The diversity of sprays and dusts which are on sale for the control of pests and diseases can be bewildering, and there is also the difficulty of diagnosing the cause of trouble in plants; yet it is essential to know the cause before selecting a spray material, as most of these are specific in action and one which kills caterpillars for example is useless in controlling diseases.

With pests the appropriate spray should be applied as soon as signs are observed, whereas with disease a protective coat of spray has to be maintained by repeated applications throughout the growing season so that the air-borne spores which spread the disease do not fall on an unprotected portion of the plant.

Sprays for Diseases

Some sprays to control disease are as follow:

Bordeaux mixture (4 oz of bluestone, 5 oz of hydrated lime to 4 gallons of water) or copper oxychloride (3 oz.) for such diseases as leaf spot, bacterial blast, tomato blight, downy mildew, and curly leaf. Bordeaux mixture is used more during the dormant season, as it may damage the leaves of ornamental plants during the growing season.

4 oz of bluestone = 7 level tablespoons
5 oz of hydrated lime = 22 level tablespoons
4 gallons of water = 1 kerosene tin
3 oz of copper oxychloride = 7½ level tablespoons

Lime sulphur (3½ fl. oz.) and **colloidal sulphur** (½ oz) for powdery mildew and rust, also red spider mite.

3½ oz of lime sulphur = 7 tablespoons
½ oz of colloidal sulphur = 3 level teaspoons

Zineb (1½ oz) for tomato blight, tomato leaf mould, leaf spots, rust, and to a small extent mildew; a good general fungicide.

1½ oz of zineb = 7½ level tablespoons

Captan (1½ oz), similar to zineb.

1½ oz = 7½ level tablespoons

Thiram (1¼ oz 50 per cent w.p.) for grey mould (botrytis); otherwise similar to zineb.

1¼ oz = 7¾ level tablespoons

Phaltan (1¼ oz) for black spot and mildew of roses. Promises to be a good general fungicide.

1¼ oz = 10 level tablespoons

Karathane (1¼ oz) for powdery mildew.

1¼ oz = 5 level tablespoons

The quantities given are for four gallons of spray, that is, one kerosene tin full. The chosen spray should be applied on an average once in 14 days during the growing period. Most diseases are more prevalent during warm, humid weather, when more frequent spraying, about once a week, will be necessary. Rain falling immediately after spraying will dilute the chemicals and make them less effective, but it is unwise to exceed the recommended strength of spray, as foliage is readily scorched.

Sprays for Pests

Sprays to control pests are:

DDT (½ oz 50 per cent wettable powder) for beetles, weevils, caterpillars, and other biting pests; **not** for aphids.

½ oz = 2 level tablespoons

Lindane (1 oz 25 per cent wettable powder) for aphids, and to a certain degree most other pests.

1 oz = 4 level tablespoons

Malathion (1 oz 50 per cent wettable powder) for aphids and thrips, red spider mite, and to an extent most other pests.

1 oz = 2 level tablespoons

Summer oil (1 pint) for scale.

Nicotine sulphate and lead arsenate are not recommended, as the materials given are equally effective and less poisonous. Wettable powders are recommended in preference to emulsion (liquid) forms of most spray chemicals, as they are less damaging to decorative plants. The following are the quantities to each 4 gallons of water when emulsions are used:

DDT (20 per cent) = 1 fl. oz. = 2 tablespoons
Lindane (20 per cent) = ¾ fl. oz. = 1½ tablespoons
Malathion = 1 fl. oz. = 2 tablespoons

Before mixing two spray materials, make sure that they are compatible; otherwise leaves and flowers will be scorched and may drop. For example, both karathane and lime sulphur are incompatible with many of the other sprays.

Combination sprays and dusts are retailed by some manufacturers either for individual crops or as general garden sprays. These contain a mixture of therapeutants to control the majority of pests and diseases likely to be present, so that only one bottle of spray material is needed instead of three or four. They are easy to use and require no knowledge of pests, diseases, or therapeutants to be used effectively.

The only disadvantage is that some of the chemicals may be unnecessary on particular occasions, so that a cheaper alternative would then be satisfactory.

When therapeutants are to be used **the label should be read** and **the directions followed carefully.** Keep all spray materials in a safe place away from children and animals.

A spray which has been mixed with water should be used as soon as possible, and any not used should not be retained, as its composition may gradually change into one which is harmful to plants.

Most of the spray materials on sale to home gardeners contain spreading and sticking agents which improve their efficiency. Unless specifically advised by the manufacturers, detergents or other spreaders should not be added.

From the lists given it should be possible for the home gardener to choose a minimum number of spray materials which will control most of the pests and diseases on a wide range of plants reasonably well.

Paths, Parking Lots, Etc.

Such areas as paths and parking lots should be sprayed now and in the autumn with a mixture of 1 oz of dalapon and 1 fl. oz. of 2,4-D to 30 sq. yd. This is considerably cheaper than using soil sterilants such as simazine and is as effective in most cases. Apply with care to avoid damage to susceptible crops and ornamental plants.

House Plants and Glasshouses

Pest and disease control on house plants is particularly difficult, as so many of these plants are very susceptible to spray damage. For this reason it is essential to buy or propagate healthy plants and to grow them under suitable conditions so that they are likely to remain healthy. Plants with soft leaves are more likely to develop grey mould if the atmosphere is cold and damp. If it is very hot and dry, red spider mite and thrips multiply rapidly.

Remove any leaf or part of a leaf infected with pests or diseases at once to prevent spread. Watch for and remove small caterpillars. If mealy bug appears, dab it with a paint brush dipped in methylated spirit.

Any unhealthy or infected plant should be immediately isolated.

Tubers of gloxinia, begonia, achimenes, etc., may now be started into growth by placing them close together in a box so that they are just covered with a light soil mixture containing a high proportion of sand and peat. Water and place in a warm, humid atmosphere. It is sometimes difficult to recognise the upper and lower sides of tubers, but there is usually a slight hollow on the **upper** surface from which the leaves develop.

Sow

Sow frost tender annuals for planting outside later on.

Ferns may be sown. The "seeds" of these, called spores, are found on the back of some mature fronds as brown powdery eruptions. If a large number of plants are required, these fronds should be picked and placed in a paper bag in a warm, dry position to collect the minute spores. An easier method for the home gardener is to cut the mature sporulating frond and place it, or part of it, on the surface of the prepared seed pan, so that the spores will drop directly on to it.

The seed pan should be well drained and filled with a light seed sowing mixture, with a ¼ in. layer of fine sand on the surface. After sowing, cover the pan with a sheet of glass, and stand in a saucer of water in a warm position, preferably enclosed in a frame. In this way a warm, damp atmosphere is maintained and this is necessary for the germination of fern spores.

The tiny plants appear at first as a green film on the sand. When they are almost touching the glass it should be raised gradually until after about a week it can be removed and the seedlings pricked out into boxes or pans. Lift clumps of seedlings and plant out an inch apart and water in. Keep in a warm, damp, still atmosphere to encourage rapid growth, so that by summer the clumps may be potted up individually into very small pots. Most ferns should be grown in the smallest size of pot suitable to the root system.

Other house plants which require it may now be repotted. Cut back and reshape any plants which need this treatment, as at this time of the year they will quickly make new growth.

Take leaf and stem cuttings and insert in a sandy soil mixture to root. Leaf cuttings should be taken from healthy young leaves which are almost fully grown. Very young or old leaves often give unsatisfactory results.

Floral Decoration

Australian shrubs are flowering freely now. Some which are particularly valuable for floral decorations are hypocalymma, adenandra, chamaelaucium, coleonema, thryptomene, and micromyrtus. Small pot-grown plants may be purchased now and planted on well drained soil in a sunny position.

Chamaelaucium, the Geraldton wax flower, is seldom seen in New Zealand, though its graceful green plumes have starry, deep pink flowers for about three months and these last very well when cut. As it comes from a part of Australia which has only 10 to 12 in. of rain a year, it does well close to a hedge which will rob the ground of surplus water.

The newer hybrid winter roses (hellebores) have attractively spotted petals and long stems. To prevent wilting place the ends of the stems in boiling water before arranging them.

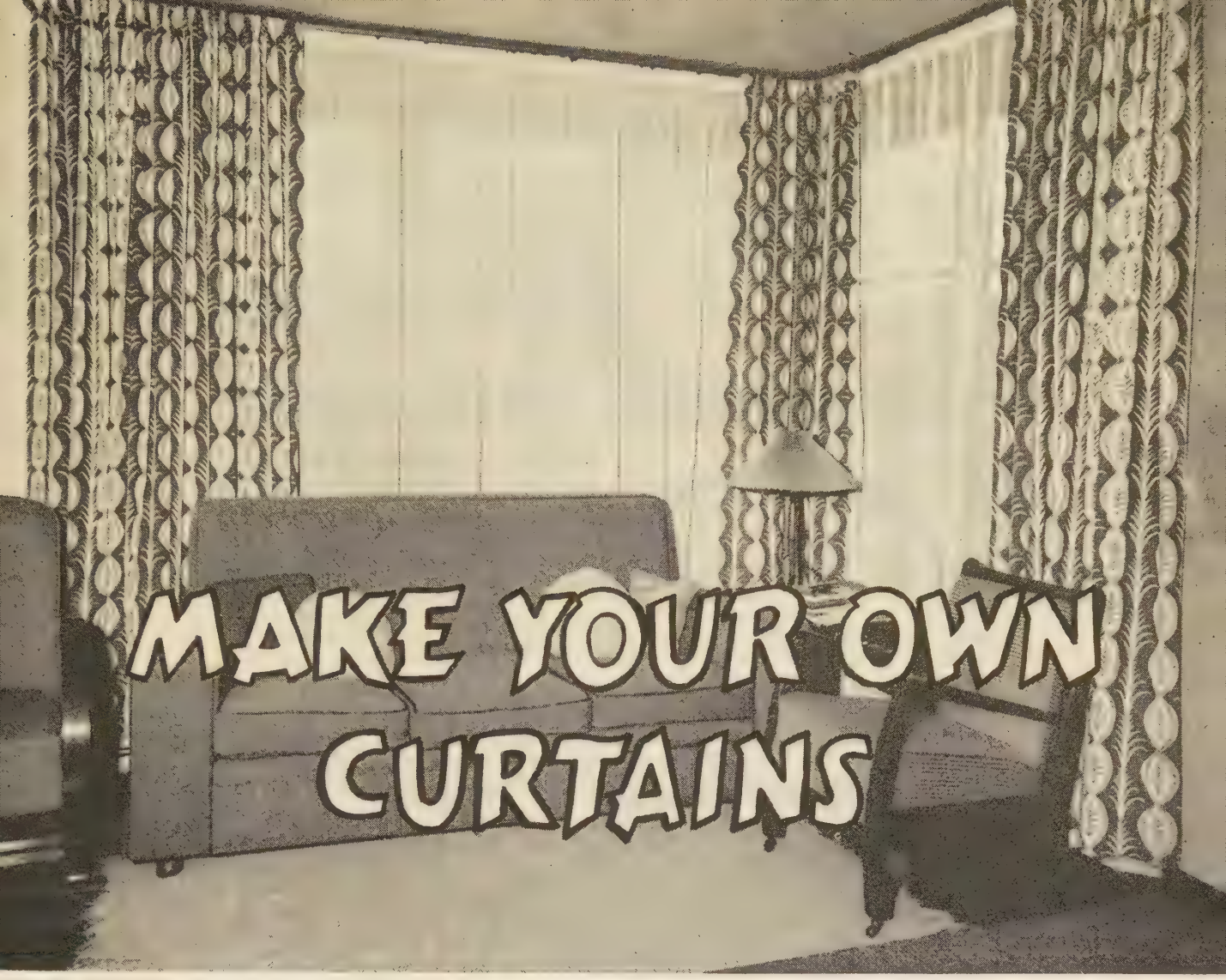
"Bulb" flowers are plentiful this month. Red or mixed anemones are reflected in the sides of a copper jug. Freesias look lovely alone in a bowl with a little foliage taken from the common white freesia, or they may form a sweetly scented cluster among other flowers. If the stems are weak and the flowers small and thin-petalled, remember to lift the corms and plant on fresh ground when flowering is over. Well grown modern freesia varieties have several large, long lasting flowers on each strong stem, and they are obtainable in distinct colours.

For sprays and corsages of flowers the individual bells of hyacinth when wired are very dainty and long lasting, and mix well with most other flowers.

Less common flowers which are out now are bilbergia, clivia, and strelitzia. Strelitzia may be dried for winter use, and keeps its colour well if dried in the dark.

The salmon clivia (*C. miniata*) is easily grown in semi-shade under trees in the north, or as a tub plant in the south. It is long lasting when cut, and the cluster of flowers on a single stem may be sufficient at the focal point of a large arrangement of mixed flowers.

The tall stems of bilbergia, with pink bract and pendulous green blue-tipped flowers are unique in colour and form. Because of the upright pink bract this flower does not have the depressing effect on an arrangement which is common with most drooping flowers. *B. nutans* can be grown in a sheltered part of the garden in the north, or as a glasshouse plant. There are many other varieties, including *B. distachia*, which is much larger, growing to a height of 30 in. All last well in water.



MAKE YOUR OWN CURTAINS

[Green and Hahn

THOUGH most women can "run up" curtains with reasonable success, they may find that some of the finer points which make for perfection have been overlooked. Perhaps the lining shows from the right side because the turn-in is inadequate or the corners of the hemline curl upward or, more frequently, the curtains look half-mast or skimpy. As the cost involved is considerable, it is worth while understanding how to achieve a completely satisfactory result. In this article the various types and styles of curtains and the best materials to use are discussed by Eleanor Couston, Home Science Instructor, Department of Agriculture, Christchurch, and next month she will describe fixtures for hanging curtains and curtain making and lining.

THE type of curtains which will be most suitable will depend partly on whether they are to be used alone or with blinds. As windows are designed primarily to admit light, fresh air, and sunshine, the practice of building houses with large expanses of glass and then leaving blinds drawn seems contradictory. Sufficiently wide soffits will prevent the high sun of midsummer from entering but allow the lower rays of winter sunshine to penetrate. So if the room is protected by a wide soffit or verandah, blinds may not be necessary. Lined, draw-across curtains may be used instead. They will be less expensive and as they provide good insulation, they will add comfort and warmth in cold weather.

Glass curtains made of sheer materials such as marquisette, nylon, muslin, or voile if hung in generous folds give a wonderfully soft look to windows. Sheer glass curtains in white or pastel colours will diffuse light, give daytime privacy, and help to obscure an uninteresting view. The straight-hanging type are usually more suitable than the cross-over type, which tend to contradict the straight lines of the windows.

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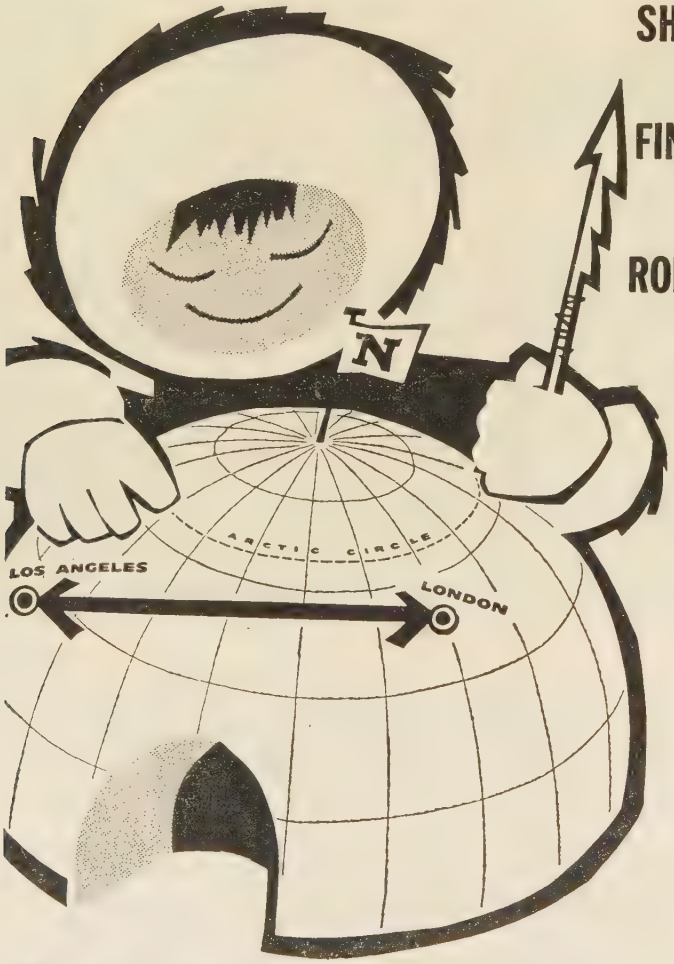

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The term "glass" curtains refers to sheer curtains which hang nearest the glass on a window or door and should not be confused with fibreglass curtain material, which is manufactured from glass filaments.

The modern trend is to treat windows as part of the wall on which they occur rather than as separate units. If the windows are too narrow, an impression of width can be created by extending the pelmet or tracking beyond the architrave or by carrying it the entire length of the wall. If the latter is done, the curtains can be pushed right back to admit maximum light and sunshine by day and be drawn snugly across at night.

Bay windows are more successfully treated by hanging wide curtains at either end of the bay and linking them with a pelmet rather than by hanging narrow ones at each pane.

The choice of type of curtains to use will lie between glass curtains, glass curtains combined with side draperies, side draperies only, or draw-across draperies.

Styles in Curtains

The next point to consider is which style to choose.

Tailored Curtains

These hang straight and are usually a safe choice, as they repeat the lines of the window and so produce no complication of distracting lines.

Tie-back Curtains

The term "tie-back" refers to a band or cord used to hold a curtain back from the straight hanging position. Tie-backs may be used to break the height of very high windows or to give a softening effect. They may also serve the practical purpose of holding curtains back to admit more light to rooms such as kitchens or bathrooms.

Tier or Cafe Curtains

These are a variation of the tailored style and have been adapted from those used in French cafes. They are made in two or more tiers which hang on separate fittings so that the top tier overlaps the lower. As each tier can be drawn independently, one part of the window may be covered, either for privacy, to prevent glare from the sun, or to conceal an unattractive feature such as coloured leadlights, while the other part is left free for view and ventilation. However, they are not suited to all types of windows and from the decorating aspect one-piece curtains are generally preferable.

Glazed Chintz Blinds

Heavy quality glazed chintz is sometimes used in place of holland for roller blinds and these take the place of both curtains and blinds. They are used mainly in kitchens or for small windows in halls, bedrooms, or bathrooms.

Choice of Fabric

The type of fabric chosen should be in keeping with the character of the room. For instance:

Glazed chintz, mercerised cotton, or cretonne is suitable for a bedroom;

Repp or textured cotton for a living room;

Printed linen or cretonne for a sitting room;

Contemporary print or furnishing tweed for a contemporary room;

Regency stripe for a formal dining room;

Velvet, damask, or tapestry with period furniture;

Gay cotton, terrycloth, or gingham for kitchen or bathroom.

Colour Fastness

To avoid the disappointment of curtains fading or of losing colour during washing check the manufacturer's label for a "colour fast" guarantee. Though some fading may occur eventually if the curtains are subjected to strong sunlight, materials which carry the guarantee will be superior to those which do not. Linings to draperies will afford extra protection.

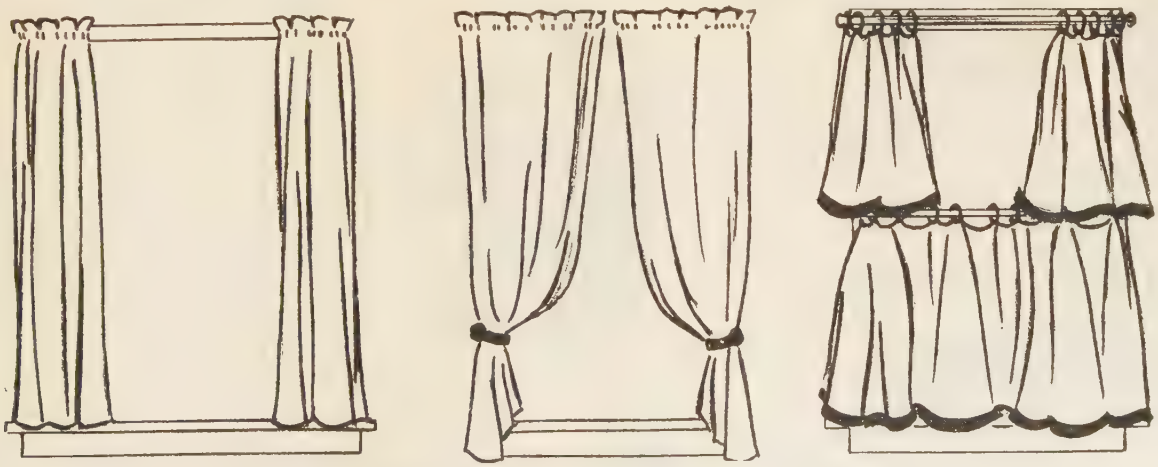
Shrinkage

The possibility of shrinkage presents another problem particularly with fabrics which are to be laundered. The manufacturer's label stating that the fabric is pre-shrunk is a safeguard. Some authorities recommend that fabrics which do not carry a guarantee should be pre-shrunk before being made up, but others consider that this is labour wasted, as further shrinkage may occur in subsequent washings.

With glass curtains, other than those made from man-made fibres which are shrink proof, a good precaution is to allow an extra 1 to 2 in. per yard to the measurement. This can be formed into tucks which can either be concealed behind the heading or be used as a decorative finish on the face of the curtain.

Sometimes non-washing fabrics will shrink due to absorption of moisture from the atmosphere. When making curtains from fabrics which are not suitable for tucking leave generous hems and heading allowances and these can be used to lengthen them if necessary.

Lining materials will almost certainly have a different rate of shrinkage from the outer fabric. Because of this, loose linings, which are made separately, are more practical than bag



Curtain styles (sill length): Left, tailored; middle, tie-back; right, tier or cafe.

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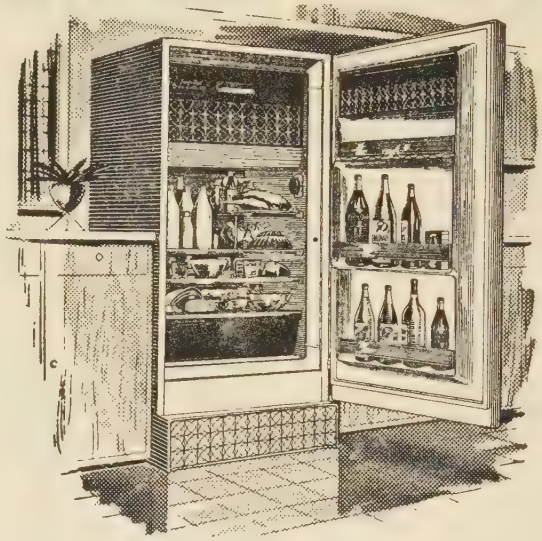

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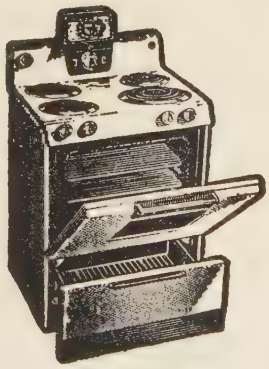

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linings, which are machine stitched to the curtain fabric.

Straight Grain

Before purchasing, check to see that the grain of the material is straight. An off-grain fabric will not hang correctly and making up may be further complicated because the pattern and the grain do not coincide. Should the material be found to be off-grain after the purchase is made, it should be washed or dampened and stretched into position before being made up. If the pattern has been printed off-grain and the material subsequently coated with a resin-glazed finish, the only alternative is to cut according to the pattern and not according to the grain.

Choice of Colour

As the window treatment will form part of the over-all colour scheme, the colour of the curtains must be in harmony with the other furnishings and also with the view outside, for which the curtains form a frame. Curtains should never be drab, but if the room is small and already has sufficient colour contrast, a colour which blends with the walls will be best. However, when the room lacks interest curtains in a contrasting colour, and, possibly, patterned, will lift it from the doldrums. The effect of both daylight and artificial light should be studied before a choice is made.

Patterned or Plain?

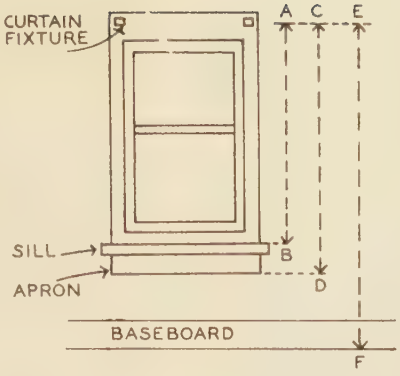
In the piece a patterned fabric usually appeals more than a plain one and so is often chosen without the complications being considered. Where there is little or no other pattern in a room, pattern in the curtain fabric will be both striking and correct, but if the carpet, upholstery, or wallpaper has a well defined pattern, the curtain fabric will be better plain or perhaps striped or checked. If a patterned material is considered, it should be studied draped in folds, as some patterns lend themselves better to draping than others.

With a patterned fabric, allowance must be made for the extra material required for matching the design.

Length and Width of Curtains

Though curtains for floor-to-ceiling windows or for formal rooms should always reach the floor, those for small rooms, for rooms with high windows, or for kitchens and bathrooms are generally short. Whether long or short, curtains should always stop at an architectural feature and not mid-way. Thus their length will be either sill length, apron length, or floor length.

To skimp on the width is false economy. Full, generous curtains will "make" a furnishing scheme, while narrow ones which are stretched to their limit create the impression of



Curtain lengths: A to B, sill length; C to D, apron length; E to F, floor length.

frugality. When the budget limits the expenditure it is better to wait a little longer or to choose a cheaper fabric rather than to compromise with an inadequate amount of material. Unless blinds are essential for controlling sunlight, curtains can serve a dual purpose and also will be less costly than blinds.

The amount of fullness to allow will depend on the style of curtain and on the weight of fabric. Heavyweight fabrics require from one and a half to twice the width of the space they are to cover while sheer fabrics require at least twice and sometimes three to four times the width of the space.

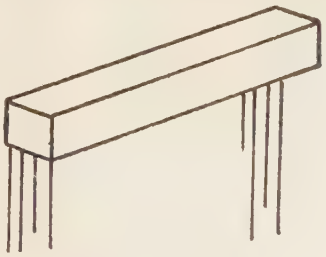
For side curtains one full width of double-width material is usually adequate for each curtain.

Pelmet, Valance, or Heading

An appropriate treatment for the top of the curtains will conceal the fixtures and provide a finished look. Though an original touch might be introduced by using a draped swag or a rod-and-ring heading, the more usual choice will be either a pelmet, a valance, or a pleated or gathered heading.

Pelmet

A pelmet board (or cornice) is the simplest type of treatment. This consists of a horizontal board with a facing and side ends about 6 to 9 in. deep. As the facing will conceal the top of the curtains, a heading for these



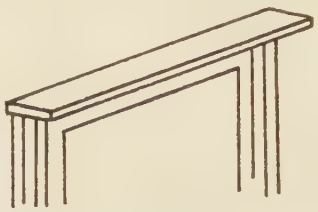
Pelmet or cornice.

is not necessary. The rod or tracking from which the curtains hang is fixed behind the facing of the board.

So that the curtains can be taken down easily for cleaning, sufficient space should be allowed between the curtain rail and the facing of the pelmet. If the curtains are very thick and heavy, the pelmet may be hinged so that it will swing upward when removing the curtains. Alternatively, the pelmet may be fixed with screws which can be removed easily to allow the pelmet to be lifted off to give access to the curtain tracking.

Valance

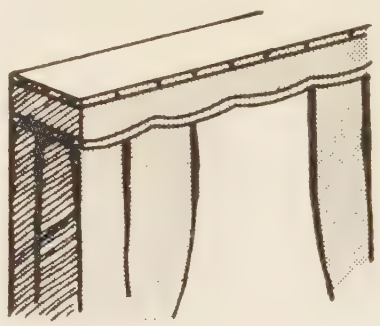
The use of a valance is another means of concealing the top of the



Valance board.

curtains, thereby obviating the need for headings. A valance may be flat, gathered, or pleated and its depth should be in good proportion to the length of the curtains (about one-sixth to one-eighth of the total length).

For a **flat valance**, which may be either straight edged or shaped, a board is attached horizontally to the top of the window frame and the valance is hung from this.



Flat valance.

The valance will require a lining and a stiffening material such as "Vilene", sparterie, or buckram. If the covering material lacks body, an interlining will also be necessary.

Plan the shape of the valance, allowing sufficient width for the return round the ends of the valance board to the walls at the sides.

Cut a paper pattern to the required shape.

Cut a piece of stiffening material the same size as the pattern.

Cut the fabric, interlining (if used), and the lining with an allowance for turnings.

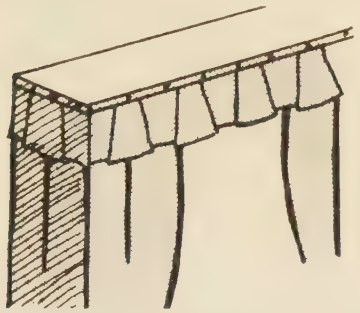
Place the fabric face downward and lay the interlining (if used) on top. Lay the stiffening material in position.

Turn the seam allowances in over the stiffening, clipping or notching them if necessary to make them lie flat. Baste or herringbone down lightly, using long stitches.

Turn in the seam allowance on the lining and slip stitch this into place.

The lower edge may be left plain or finished with a braid or edging or with covered piping.

Attach twill tape to the top of the valance and fasten it to the valance board with furnishing tacks.



Pleated valance.

For a gathered or pleated valance two rods or double tracking are used, one to hold the curtain and the other to hold the valance. The width of material required will be one and a half times the width of the top of the window for the gathered type, or two and a half times for a pleated one. This type of valance is made in the same way as a curtain.

Heading

When a gathered or pleated heading is used a board is not necessary, as the heading will conceal the rod and fixtures. If the curtain material is soft, the heading should be lined with "Vilene" or tailor's canvas to make it stand erect. An alternative is to use special tape and long-necked hooks, which are designed for the purpose.

Gathered headings are made by attaching draw-up tape to the stitching line of the heading at the back of the curtain. The fullness is regulated by drawing the cords of the tape to the required size and the rings or hooks are attached to this. The long ends of the cords should not be cut so that the curtains can be fully extended for cleaning purposes.

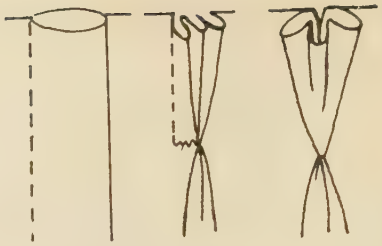
Pleated headings are used a great deal by modern decorators for the heavier type of draperies and can be formed by hand or by using special tape and hooks when these are available. Pinch pleats and cartridge pleats are both very effective and give regulated spacing to the fullness of the curtains. Pleats should be made in groups of uneven numbers, three, five, or seven, depending on the width of the fabric.

To plan the spacing of the pleats measure the finished width of the curtain. Measure the amount of window the curtain has to cover, allowing about 3 in. "return", that is, the distance from the curtain fixture to the wall at the back, and 2 in. at the centre front. Subtract this amount from the width of the curtain. The difference is the amount available for pleats. The allowance for each pleat will depend on the weight of fabric and on the type of pleat being used. In heavyweight fabrics approximately 5 in. per pleat will be required for "pinch" pleats, and 4 in. per pleat for "cartridge" pleats. Divide the allowance for pleats by the number of pleats required to get the allowance for each pleat.

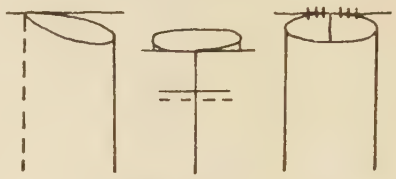
Make the first pleat 3 in. from the wall, the second pleat 2 in. from the centre, and the third pleat in the exact centre between the first and second. Repeat for remaining pleats.

For pinch pleats stitch the pleats from the top edge to the depth of the heading. Divide each pleat into three and crease. Hand sew the pleats together at the base.

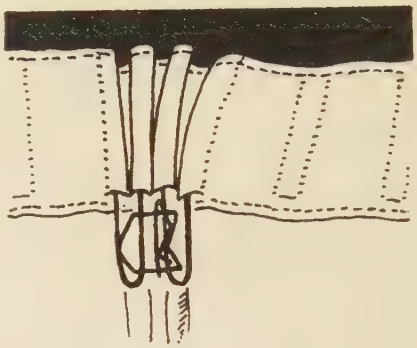
For cartridge pleats stitch the pleats from the top edge to the depth of the heading. Open pleats and stitch back to the top edge of the curtain.



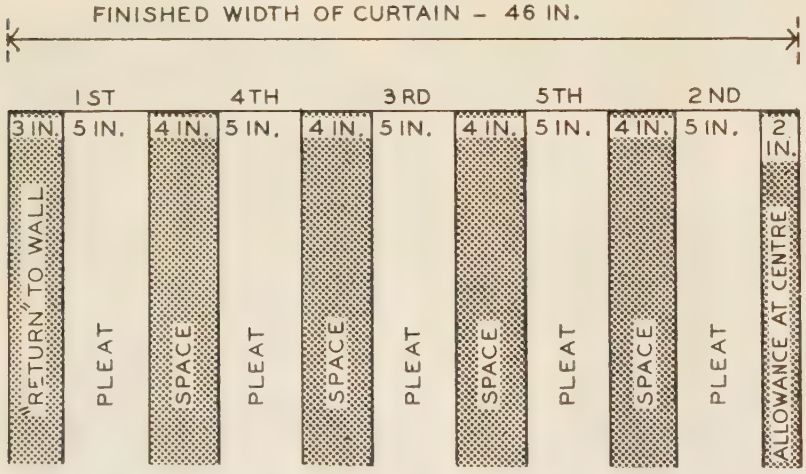
Pinch pleats.



Cartridge pleats.



Pinch pleats made by using deep pleat tape and a metal pleater.



Planning the spacing for a pleated heading (example): PLEATS (groups of uneven numbers): Finished width of curtain = 46 in.; amount of window to cover = 21 in.; therefore, amount of material for pleats = 25 in. This allows for five pleats of 5 in. each. SPACING: Allow 2 in. at the centre and 3 in. "return" to the wall; amount of window to cover = 21 in., less 5 in. = 16 in.; therefore, amount of material for spacing = 16 in. As there are five pleats, four spaces between pleats must be allowed for, therefore each space = 4 in.

Jacket in Twisted Rib Stitch

A VARIATION of the ever-useful knitted jacket, with that desired different look given by a twisted rib stitch, can be made by following the instructions given here. The garment will look attractive in any colour.

ABBREVIATIONS: K., knit; p., purl; st., stitch(es); rep., repeat; patt., pattern; dec., decrease; cont., continue; inc., increase; rem., remain(ing); tog., together; beg., beginning; foll., following; sl., slip.

Materials: 23oz. of double knitting wool; 2 No. 9 and 2 No. 12 knitting needles; 9 buttons.

Measurements (to fit a 34in. to 36in. bust): Length from shoulder, 23in.

Tension: 7½ st. to 1in. over the rib pattern.

The Pocket Linings (both Alike)

With No. 9 needles cast on 42 st. and work thus:—

1st row: * K. 2, p. 2. Rep. from * to last 2 st., k. 2.

2nd row (right side): * P. 2, k. into front of second st., then in front of first st. Rep. from * to last 2 st., p. 2.

Rep. these 2 rows until the work measures 4in., ending after a wrong side row. Leave st. on the spare needle.

The Right Front

With No. 12 needles cast on 62 st. and work 12 rows in k. 1, p. 1 rib. Change to No. 9 needles and cont. in the 2-row patt. as for the pocket lining until the work measures 5¼in., ending after a wrong side row.

Next row: Patt. 12, sl. next 42 st. on to a st. holder, patt. across 42 st. of pocket lining, patt. to end.

Work straight until the front measures 14in., ending after a right side row. Leave st. on a spare needle and make a half sleeve thus:—

Using No. 9 needles cast on 2 st.

1st row: K. 2.

2nd row: Cast on 4, p. to end (right side).

3rd row: Work twice into first st., k. 1, p. 2, k. 2.

4th row: Cast on 4, patt. to end.

5th row: Work twice into first st., patt. to end.

Cont. in this way, casting on 4 st. at beg. of every right side row and inc. 1 st. at beg. of every wrong side row until there are 62 st., then cont. inc. 1 st. on alternate rows at outside edge, but casting on 3 st. instead of 4 on inside edge on alternate rows until there are 86 st. thus ending after a wrong side row, then patt. across right front st.

Now shape thus:—

1st row: Patt. to last 2 st., work 2 tog.

2nd row: Dec. 1 st., patt. to end.

3rd and 5th rows: In patt.

4th and 6th rows: Cast off 3, patt. to end.

Rep. last 6 rows until there are 84 st., ending at front edge.

Next row: Cast off 4, patt. to last 2 st., work 2 tog.

Now cont. dec. at side edge as before, dec. 1 st. at front edge on next 6 rows. Work 2 tog.

Next row: Patt. to neck edge, turn. Now still dec. at side edge as before, dec. 1 st. on next 4 alternate rows at neck edge.

Next row (side edge): Cast off 3, patt. to end.

Next row: Work 2 tog., patt. to end.

Shaping the Shoulder

Cast off 4 st. at beg. of next 2 alternate rows, then cast off 13 st. at beg. of next 2 alternate rows and 14 st. at beg. of foll. alternate row.

The Left Front

Work as for the right front until there are 5¼in. worked from beg., ending after a wrong side row.

Next row: Patt. 8, sl. next 42 st. to stitch holder, patt. across 42 pocket lining st., patt. to end.

Cont. in patt. until the work measures 14in., ending after a wrong side row. Leave st. on a spare needle and make a half sleeve thus:—

Using No. 9 needles cast on 2 st.

1st row: P. 2.

2nd row: Cast on 4, k. to end.

3rd row (right side): Work twice into first st., p. 1, k. into front of second st., then in front of first st., p. 1.

4th row: Cast on 4, patt. to end.

5th row: Inc. in first st., patt. to end.

Work to match other sleeve, reversing shapings, thus ending after a right side row. Work thus:—

1st row: In patt. across st., then patt. across 62 st. of left front.

2nd row: Patt. to last 2 st., work 2 tog.

3rd and 5th rows: Cast off 3, patt. to end.

4th and 6th rows: Patt. to end.

7th row: Dec. 1 st., patt. to end.

Rep. from second to seventh rows inclusive until there are 84 st.

Next row (front edge): Cast off 4, patt. to last 2 st., work 2 tog.

Work to match the right front, reversing shapings.

The Back

With No. 12 needles cast on 130 st. and work 12 rows in k. 1, p. 1 rib.

Change to No. 9 needles and work in the 2 row patt. as for the pocket linings until the work measures 14in., ending after a wrong side row. Leave st. on a spare needle and work a right back sleeve as for the left front sleeve, thus ending after a right side row, then patt. across back st. and leave once more on spare needle. Work a left back sleeve as for the right front sleeve, ending at the inside edge, and

patt. across back and other sleeve st. (302 st.).

Shape thus:—

1st row: In patt., dec. 1 st. each end of row.

2nd row: As first row.

3rd and 4th row: Cast off 3 st., patt. to end.

Rep. last 3 rows (second to fourth rows inclusive) until there are 134 st.

Next row: Dec. 1 st. each end of row (130 st.).

Now cast off 4 st. at beg. of next 4 rows, 13 st. at beg. of foll. 4 rows, and 14 st. at beg. of next 2 rows. Cast off rem. st.

The Cuffs

Sew shoulder and top sleeve edges tog. Then using No. 12 needles and holding right side of the work toward you pick up and k. 48 st. along cuff edge and work 3¼in. in k. 1, p. 1 rib. Cast off in the rib.

The Neck Border

With the right side of the work toward you and using No. 12 needles beg. at right front edge and pick up and k. 82 st. all round neck edge. Work in k. 1, p. 1 rib for 12 rows. Cast off in the rib.

The Right Front Border

With the right side of the work toward you and using No. 12 needles beg. at lower edge and pick up and k. 10 st. in welt, 130 st. to lower edge of neckband, and 10 st. along small side edge of neckband.

Work in k. 1, p. 1 rib for 5 rows.

Next row: Rib 2, * cast off 2, rib 16 (including st. left on right hand needle from casting off). Rep. from * to last 4 st., cast off 2, rib 2.

Next row: Rib 2, * cast on 2, rib 16. Rep. from * to last 4 st., cast on 2, rib 2.

Work in rib for 5 more rows. Cast off in the rib.

The Left Front Border

Work to match the right front border, omitting buttonholes and beg. at top of neck.

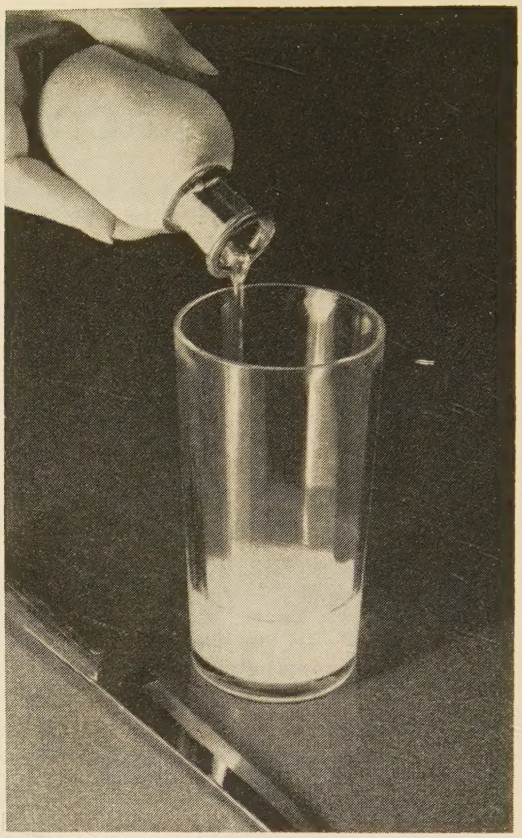
The Pocket Tops

Rejoin wool to st. left on st. holder, and using No. 12 needles work in k. 1, p. 1 rib for 12 rows. Cast off in the rib.

To Make up

Press the work with a hot iron over a damp cloth. Sew up undersleeve and side seams. Sew the pocket linings into position, then sew down the small pocket edges. Sew on the buttons to the left front to correspond with the buttonholes. Press all the seams.

A Handy Juice Extractor

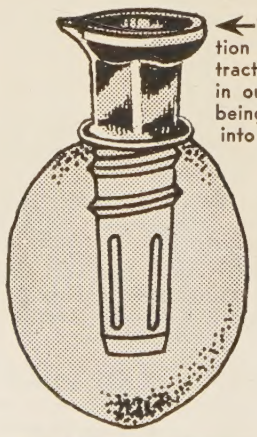


[*Sparrow*

The extractor has a pouring lip and a screw-type hollow body which screws down in the centre of the fruit over the core.

THERE are many kitchen gadgets on the market, some being just novelties that are enthusiastically used for a month or so and then put away in a back drawer with the other white elephants. Others like the juice extractor illustrated here are a real help in the kitchen.

THIS little "juicer", only 2 in. long, is made of polished aluminium and is easy to keep clean. The same type of gadget is available in plastic. It is ideally suited to extract the juice from lemons when, as often happens, the recipe calls for a small quantity of juice.



← Construction of the extractor, shown in outline after being screwed into a lemon.

To use it, first free the juice by rolling the fruit on a hard surface. Next cut the tip off the lemon and insert the extractor, screwing it down as shown at left below as you would a corkscrew. Squeeze the fruit gently and the juice, without any pips, will flow freely from the pourer.

This gadget can also be used as a corer for apples or pears, but needs to be used at both ends for very large fruits.

—*NAOMI F. BANKS,*
Home Science Instructor,
Department of Agriculture,
Auckland

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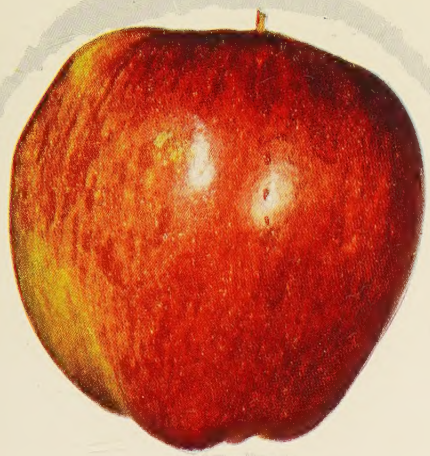

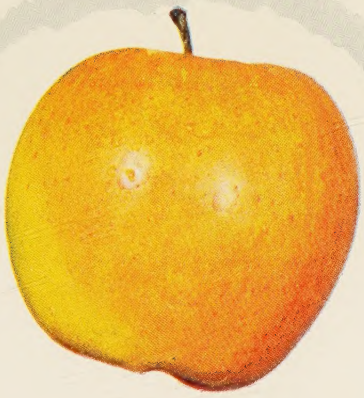

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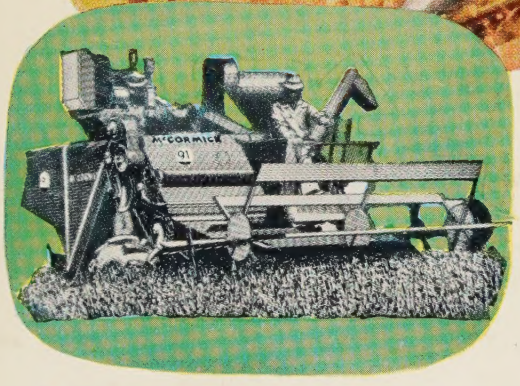

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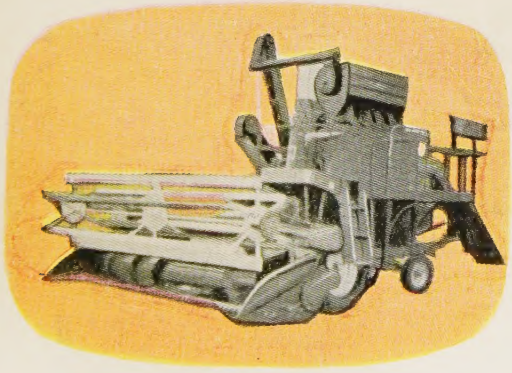

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